This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

**Usage guidelines**

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

+ *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.

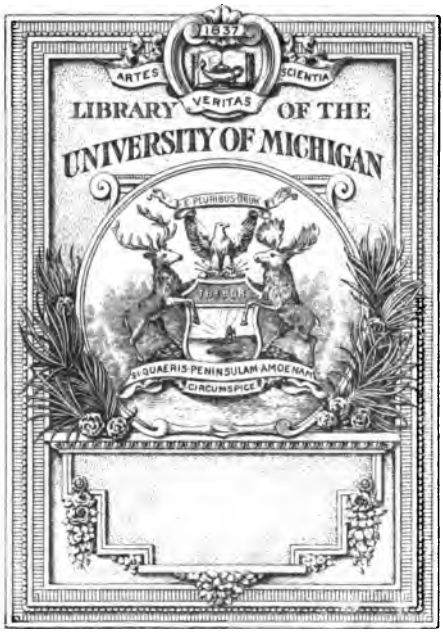
+ *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.

+ *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.

+ *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

**About Google Book Search**

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at `http://books.google.com/`


1837
ARTES
SCIENTIA
VERITAS
LIBRARY OF THE
UNIVERSITY OF MICHIGAN
E PLURIBUS UNUM
SI QUAERIS PENINSULAM AMOENAM
CIRCUMSPICE

Z
5055
.U5
M41
1893

Gr. O

Massachusetts Institute of Technology.

A REGISTER

1245-33

OF

# PUBLICATIONS OF THE INSTITUTE

AND OF ITS

# OFFICERS, STUDENTS AND ALUMNI.

## 1862–1893.

COMPILED BY

WILLIAM RIPLEY NICHOLS.

Third Edition.

REVISED BY

LEWIS M. NORTON AND AUGUSTUS H. GILL.

*PUBLISHED BY THE ALUMNI ASSOCIATION.*

BOSTON:

CARL H. HEINTZEMANN, PRINTER, 234-6 CONGRESS STREET,

1893.

# PREFACE TO FIRST EDITION.

The following list is intended to include the books, pamphlets, reports, contributions to periodicals — everything, in fact, except contributions to daily journals — printed between 1862 and 1881 by, —

1st. The Institute (officially);

2d. Professors and other instructors, *during their connection with the school;*

3d. Special students, *during their connection with the school;*

4th. Alumni and holders of certificates of proficiency, during their connection with the school, *and in after life.*

The compilation, at the present time, was resolved upon for three reasons: 1st, it was felt that the longer the matter was delayed, the less likelihood would there be of its being ever accomplished; 2d, circumstances, not likely to occur again, made it possible for the compiler to give the necessary time to the work; 3d, and chiefly, it was thought that it would be a pleasant thing to give to Professor ROGERS, as he retires from active duty, this new evidence of the usefulness of the school in whose beginnings he has had so great a share.

The publication of the list has been made possible by the generous subscriptions of professors, alumni, and friends, and by the aid of the Alumni Association. The compiler is under obligations to a great many persons for assistance in collecting material and, especially, for advice and counsel to Professor Charles R. Cross, Secretary of the Alumni Association.

It is hoped that this will be followed in the course of five or, at most, of ten years by a similar bibliography, covering the interval; and all persons whose names should appear in the list are earnestly requested to communicate to the undersigned any errors or omissions which they may discover in the present issue, and also to furnish him with the titles of whatever they may print promptly as the articles appear. The work will be kept in such shape that, in case of accident to the present compiler, some one else can readily take it up and carry it on.

WM. RIPLEY NICHOLS.

*Mass. Institute of Technology,*
*Jan.* 14, 1882.

## PREFACE TO SECOND EDITION.

At a meeting of the Alumni Association held in Dec., 1886, it was voted to print either a supplement to the "List of Publications," prepared by the late Professor NICHOLS, or to revise and reprint the whole list. In response to a circular issued by the committee in charge, a nearly unanimous desire was expressed that the first list be revised and reprinted. Slips containing a list of all publications known to the committee were sent to each alumnus for revision, and from these lists the second edition of the "Publications" was prepared. The general plan of the first edition has been followed, but it has been found necessary to confine the citations to the original place of publication. The titles of publications by those who were former students but not graduates of the Institute are much more complete than in the first edition. The total number of titles given is sixteen hundred.

LEWIS M. NORTON.

*Mass. Institute of Technology,*
*January*, 1888.

## PREFACE TO THIRD EDITION.

No truer index of the value of an educational institution can be found, than the work which its alumni have done and are doing.

It was believed that, in connection with the exhibit of the Institute at the Columbian Exposition, a new edition of the "Register of Publications" should fill a worthy place.

The late lamented Professor Norton again undertook the work, following out the methods and plan of the second edition — which have been kept by the present editor. The total number of titles given is nearly twenty-nine hundred, an increase of about thirteen hundred.

AUGUSTUS H. GILL.

*Mass. Institute of Technology,*
*July* 1, 1893.

# TABLE OF CONTENTS.


| | PAGE. |
|---|---|
| FOUNDATION: ANTICIPATORY PUBLICATIONS | 7 |
| PUBLICATIONS OF THE INSTITUTE | 8 |
| PUBLICATIONS OF THE SOCIETY OF ARTS | 14 |
| PUBLICATIONS OF THE ALUMNI ASSOCIATION | 15 |
| PUBLICATIONS OF THE ARCHITECTURAL ASSOCIATION | 16 |
| PUBLICATIONS OF CLASS ASSOCIATIONS | 16 |
| PUBLICATIONS OF THE SOCIETY OF MECHANICAL ENGINEERS | 18 |
| PUBLICATIONS OF THE STUDENTS | 19 |
| PUBLICATIONS OF OFFICERS, STUDENTS AND ALUMNI | 20 |

## DESIGNATION OF THE COURSES.

I Civil and Topographical Engineering.
II. Mechanical Engineering.
III. Mining Engineering and Metallurgy.
IV. Architecture.
V. Chemistry.
VI. Electrical Engineering.
VII. Biology.
VIII. Physics.
IX. General Studies.
X. Chemical Engineering.
XI. Sanitary Engineering.
XII. Geology.
XIII. Naval Architecture.

# PUBLICATIONS

OF THE

# Massachusetts Institute of Technology,

ITS

OFFICERS, STUDENTS, AND ALUMNI.

## FOUNDATION: ANTICIPATORY PUBLICATIONS.

1859. Conservatory of Art and Science. Containing a report of a meeting held Feb. 18, 1859. 4to, pp. 2. Ditto, Mar. 9. 4to, pp. 2.

1859. Report of a Joint Special Committee [of the General Court] to whom was referred a memorial from a Committee of Citizens, etc., etc. — [with which is printed the memorial]. House, No. 260, pp. 12. March 30, 1859.

1860. Memorial to Honorable the Senate and House of Representatives, January, 1860. House, No. 13. Pph. 8vo, 14.

1860. Objects and Plans of an Institute of Technology. [Prepared by a Committee of which William B. Rogers was chairman.] Pph. 8vo, pp. 29. Boston, 1860. 2d edition, 1861.

1861. Estimate of the Financial Effect of the proposed Reservation of Back-Bay Lands. Prepared for the Committee by M. D. Ross. Pph. 8vo, pp. 20. Boston, 1861.

1861. Testimonial of Architects, Builders, etc. 8vo, pp. 2.

1861. An account of the Proceedings preliminary to the Organization of the Mass. Institute of Technology, with a List of Members thus far associated and an Appendix containing a Memorial as below, Petitions and Resolutions in aid of the objects of the Committee of Associated Institutions of Science and Art. Pph. 8vo, pp. 23. Boston, 1861.

1861. Memorial to the Senate and House of Representatives, asking for a charter for the Mass. Institute of Technology. House, No. 13, pp. 14. n. d.

Report of the Joint Standing Committee on Education [in favor of the above-mentioned memorial]. House, No. 171, pp. 8. March 19, 1861.

1861. An Act to Incorporate the Mass. Institute of Technology. House, No. 171, pp. 8–12.

1861. Laws and Resolves passed by the General Court, Session of 1861. Chap. 183. An Act to Incorporate the Mass. Institute of Technology. pp. 40.

1863. Joint Special Committee present an Act in Addition to the Acts to Incorporate the Mass. Institute of Technology. Senate, 108, pp. 2. March, 1863.

## PUBLICATIONS OF THE INSTITUTE.

186? By-Laws [of the Institute of Technology]. Pph. 8vo, pp. 7. n. t., n. d.

1862. List of Officers, Extract from Act of Incorporation, Plan and By-Laws. Pph. 8vo, pp. 12.

1864. Scope and Plan of the School of Industrial Science of the Mass. Institute of Technology. Pph. 8vo, pp. 28. Boston, 1864.

1864. Outline of Studies in the Department of Practical Geology, Mining and Metallurgy of the School of Industrial Science of the Mass. Institute of Technology. Pph. 8vo, pp. 10. Boston, 1864.

1865. An address on the Limits of Education, read before the Mass. Institute of Technology, Nov. 26, 1865, by Jacob Bigelow, M.D. Pph. 8vo, pp. 28. Boston, 1865.

1866. An Outline of a Course of Architectural Instruction, by William R. Ware, Prof. of Architecture. Pph. 8vo, pp. 36. Boston, 1866.

1866. Semi-Annual Examination Papers for the session of 1865–6. Pph. 8vo, pp. 25. Boston.

1866. "Indenture for the establishment of a Board of Trustees to receive and manage funds which may be contributed for free Scholarships * * * submitted by a Committee appointed to prepare it," etc., Nov. 15, 1866. Pph. 8vo, pp. 5. n. t.

[1866.] Regulations of the School. Circular, pp. 3. n. d.

1866. Semi-annual Examination Papers. Pph. 8vo, pp. 25. Boston, 1866.

1867. Report of the Committee of the Mass. Institute of Technology, on the subject of Free Scholarships, etc. Pph. 8vo, pp. 13. Boston, 1867.

1869. School of the Mass. Institute of Technology. Broadside, pp. 4.

1869. Plan of the Physical Laboratory, by Edward C. Pickering, Thayer Professor of Physics. Pph. 8vo, pp. 16. Boston, 1869.

1870. Report of the Physical Laboratory. Pph. 8vo, pp. 8.

1870? By-Laws of the Corporation of the Mass. Institute of Technology. Pph. 8vo, pp. 7. n. t., n. d.

[1870.] By-Laws of the Corporation. (Same as previous title with slight addition.) Adopted July 23, 1870. Pph. 8vo, pp. 7. n. t., n. d.

1871. Report of the Secretary [Samuel Kneeland, M.D.] for the year 1870–71. Pph. 8vo, pp. 16. n. t., n. d.

Contains reports by Profs. Pickering and Watson. See below. The Secretary's Reports from 1872 to 1877 are included in the President's Reports. See below.

1871. Report of a Committee of the Faculty on the Department of Science and Literature. Pph. 8vo, pp. 4. Boston.

1872. Lowell Course of Industrial Art. Circular, pp. 3. Sept. 20, 1872.

1874. Report on Military Instruction, a Letter from the Faculty and Communication from E. L. Zalinski. Pph. 8vo, pp. 16. n. t., n. d.

1874. Memorial [to the General Court] in aid of the petition of the Mass. Institute of Technology. Fol. 1 sheet. n. d.

1875. Statement, Protest and Appeal to the Corporation of the Mass. Institute of Technology, by E. L. Zalinski [concerning military drill]. Pph. 8vo, pp. 6. Boston.

1876. Centennial Exhibition, Philadelphia. Catalogue of the Models, Instruments, Samples, Papers and Drawings exhibited by the Mass. Institute of Technology. Pph. 8vo, pp. 8. Boston, 1876.

1876. Manual Training. The Russian System of Instruction in Practical Mechanism. *Boston Com. Bull.* Sheet, 60x27.

1876. Regulations and Suggestions for the Trip to Philadelphia. June , 1876. [Prepared by E. L. Zalinski, U. S. A.] Pph. 32mo, pp. 20.

1876. Entrance Examinations. June, 1876. Pph. 8vo, pp. 7.

1876. Letter from the President [J. D. Runkle], relating to the trip to Philadelphia. Circ. sq. 8vo, pp. 3.

1876. The Russian System of Shop-Work Instruction for Engineers and Machinists. [Addressed to the Corporation by J. D. Runkle, Prest.] Pph. 8vo, pp. 24. 1st ed. July, 1876. 2d ed., with supplementary statement, August, 1876. n. t. pp. 24.

1877. Report of a Committee of the Faculty on the Department of Practical Mechanism, Feb. 21. Pph. 8vo, pp. 6. Also in the President's Report for 1877, pp. 24–28.

1877. Progress of the Physical Department of Mass. Institute of Technology from 1867 to 1877. Edw. C. Pickering. Pph. 8vo, pp. 15. Boston.

1877. Report of a Committee of the Faculty on the School of Industrial Science. Pph. 8vo, pp. 6. Boston, 1877.

1878. Memorial of the Mass. Institute of Technology to the Honorable, the Senate and House of Representatives of the Commonwealth of Massachusetts. Pph. 8vo, pp. 6. Boston.

1882. Circular with reference to Course VIII. B. Physics with special reference to Electrical Engineering. 8vo, pp. 3.

1883. In memory of Prof. William Barton Rogers, LL. D. [Circular with reference to the Rogers Building]. pp. 3. May, 1883.

1883. Circulars of Information. Course II., Mechanical Engineering. Course IV., Architecture. Course VII., Natural History. Each pp. 3–4.

1883. Circular referring to the Lowell School of Design, dated May 21, 1883. 8vo, pp. 4.

1884. Condensed Information, with reference to the Mass. Institute of Technology. Pph. 8vo, pp. 16.

1884. Notes on Hydraulics. G. F. Swain. Pph. 8vo, pp. 84. Boston.

1884. Schedule of the Regular Courses of Study of the School of Industrial Science, 1884–1885. Pph. 8vo, pp. 11.

1885. Notes on Hydraulic Experiments. Prepared for the use of

Students in Mechanical Engineering, Mass. Institute of Technology. Pph. 8vo, pp. 53. Boston, 1885.

1885. Notes on Mechanical Engineering, Drawing and the Blue Process. Pph. 8vo, pp. 16. Boston.

1885. Division of Entrance Examinations, 3. pp.; Optional Five Years' Course, 3 pp.; Lowell School of Practical Design, 4 pp. Three circulars, 8vo.

1885. Physical Laboratory Notes. Silas W. Holman. Pph. 8vo, pp. 83. Boston.

1886. [Description of] Department of Civil Engineering. Pph. 8vo, pp. 12.

1886. Descriptive Geometry. Cloth. 8vo, pp. 48, pl. 16. Boston.

1886. Illustrations and Details of American Machine Tools to accompany Notes and Lectures on the Mechanism of Machine Tools. Sq. 8vo, pp. 82.; ill. 177; pl. 1. Boston, 1886.

1887. Memorial of the Corporation to the General Court asking for an Endowment. Circular, 4to, pp. 4.

1887. The Example of the Life of John Chipman Hoadley, by Hiram F. Mills. Pph. 12mo, pp. 11.

1887. List of the Periodicals in the Libraries of the various Departments of the Institute of Technology. April, 1887. Compiled by Clement W. Andrews. Pph. 8vo, pp. 8.

1887. Course IX. Department of General Studies. Pph. 8vo, pp. 12.

1887. Course IV. Department of Architecture. Pph. 8vo, pp. 11.

1887. Department of Civil Engineering. Pph. 8vo, pp. 17. Boston, 1887.

1888. Course IX. Department of General Studies. Pph. 8vo, pp. 15. Boston, 1888.

1888. Chemistry and Chemical Engineering. Pph. 8vo, pp. 12. Boston, 1888.

1888. Department of Civil Engineering. Summer Course in Topography, Geology, and Geodesy. Circ. 8vo, pp. 3. Boston, 1888.

1889. Photogravure views of the Mass. Institute of Technology. Published by H. L. Johnson.

1889. Optional Five Years' Course. Circular, pp. 2. Boston.

1889. Five Years' Course. Pph. 8vo, pp. 6. Boston.

1889. Course XI. Sanitary Engineering. Circular, pp. 2. Boston.

1889. Course III. Mining Engineering and Metallurgy. Pph. 8vo, pp. 8. Boston, 1889.

1889. Course XI. Sanitary Engineering. Pph. 8vo, pp. 3. Boston, 1889.

1890–1. Technology Quarterly, published four times during the school year. See Publications, Society of Arts.

1890. Notes on Geometrical and Mechanical Properties of Floating Bodies. J. J. Woodward, U. S. N. Pph. 8vo, pp. 79. Pl. 15. Boston, 1890.

1890. Commemorative Address, by Augustus Lowell. June 3, 1890. 8vo, pp. 24.

1890. Technical Description of the Engineering Building of the Mass. Institute of Technology. Pph. 8vo, pp. 29, ill., 1 pl. Boston, 1890.

1890. Course XII. Geology. Circular, pp. 2. Boston.

1891. Lowell School of Practical Design. Pph. 8vo, pp. 15, Boston, 1891.

1892. Department of Biology. Pph. 8vo, pp. 11. Boston, 1892.

1892. Course IX. Department of General Studies. Pph. 8vo. pp. 8. Boston.

1892. Courses of Instruction relating to Hygiene, Sanitary Science, and Biology. Prepared for the meeting of the Mass. Med. Soc. Pph. 8vo, pp. 13. Boston, 1892.

1892. Annual Exhibition of the Department of Architecture. Pph. 8vo, pp. 60. Boston, 1892.

1892. Department of Architecture. Catalogue of Library. Pph. 8vo, pp. 19.

1892. Department of Architecture. Pph. 8vo, pp. 12. Boston, 1892.

1892. Choice of Courses. Pph. 8vo, pp. 4. Boston.

1892. Department of Mechanical Engineering. Pph. 8vo, pp. 16. Boston, 1892.

1892. Department of Civil Engineering. Pph. 8vo, pp. 22. Boston, 1892.

1892–3. Requirements for Admission. Pph. 8vo, pp. 11. Boston, 1892.

1892. Tables showing the Loss of Head due to Friction of Water in Pipes, by Edmund B. Weston. Reprinted for use of students. Pph. 8vo, pp. 38. Boston, 1892.

1893. Notes on Mechanical Engineering, Drawing and the Blue Process. Pph. 8vo, pp. 24. Boston.

1893. Syllabus of a Brief Course in English Literature. For the use of second year students in Mass. Institute of Technology. Pph. 12mo, pp. 78. Boston, 1893.

1893. Course IX. Department of General Studies. Pph. 8vo, pp. 15. Boston, 1893.

1865–66 to 1892–93. Annual Catalogues of the Officers and Students and Programme of the Course of Instruction. [From 1872 "with a Statement of the Courses of Instruction."] Pph. 8vo, Boston, 1865–93.

To the 3d Annual Catalogue there is a Supplement containing The Programme of the Course of Instruction in the Department of Architecture, pp. 14, 1868. Extracts from the 11th Catalogue (1875–76) were printed in 1876. Also a Supplement to the 15th Catalogue (1879–80) containing information for Students with reference to the various courses and studies, pp. 23. Supplement to 16th Catalogue contains information regarding requirements for admission, pp. 23. Catalogues 6 to 9, 15 to 21 contain the list of members of the Society of Arts; catalogues 6 to 9 and 19 to 21 contain plans of the buildings; catalogues 11 and 12 contain sample examination papers; catalogues 15 to 23 contain the list of graduates and their occupations; and catalogues 22 —, the titles of the theses of the graduating class of the previous year. Extracts from the 25th Catalogue were printed in 1889. The 25th Catalogue contains a statement of the Courses of Instruction.

1872–93. President's Reports for the years ending September, 1872–77, and December, 1883–92. Pph. 8vo. Boston, 1872–77 and 1883–92.

Reports from 1872–77 contain the reports of the Secretary of the Institute and of various departments of the School. The Report for 1874 contains also a list of members of the Society of Arts; that of 1875 contains a list of the Society of Arts, abstracts of the graduating theses, abstract of the course of instruction, catalogue of books, photographs, casts, etc., in the Architectural Department, list of alumni, committees of the Corporation, etc.; that of 1876 contains list of Society of Arts, abstracts of graduating theses, the catalogue of the Institute Exhibit at the Centennial Exhibition, and a catalogue of material collected at the Centennial Exhibition; that of 1877 contains a list of the Society of Arts and abstracts of the graduating theses. The reports from 1883–85 contain only the President's Report to the Corporation. Report for 1887–8 contains also Chap. 103, Acts and Resolves of 1887, Mass. General Court, and Remarks of the President to the Graduating Class, May 31, 1887.

Examination papers are issued annually in pamphlet form, pp. 4–8; also, in Catalogues 11 and 12.

1881–. Graduation Exercises. Annually, Circular.

1892. Programme of the Courses of Instruction with a Statement of the Requirements for Admission and a List of the Officers. Pph. 8vo. Boston, 1892.

## PUBLICATIONS OF THE SOCIETY OF ARTS.

1870. By-Laws of the Society of Arts of the Mass. Institute of Technology. Pph. 8vo, pp. 8. n. t.

1870. By-laws of the Corporation, with an explanatory Circular dated October, 1870, and a List of Members of the Society of Arts.

187? By-Laws of the Society of Arts. Pph. 8vo, pp. 6. n. t., n. d. [Later than 1870.]

1877. Ditto. Pph. 8vo, pp. 8. n. t., n. d. [Adopted Feb. 27, 1877.]

Abstracts of the Proceedings of the Society of Arts from 1870–71 to 1876–77 were published in the Annual Reports of the Secretary of the Institute. Lists of Members of the Society appear in various Catalogues and President's Reports. See above.

1880. Abstract of the Proceedings of the Society of Arts for the Eighteenth Year, 1879–80. Pph. 8vo, pp. 108. Boston, n. d.

1880. By-Laws of the Society of Arts. Pph. 8vo, pp. 7. n. t. Feb. 26 ,1880.

1881. Abstract of the Proceedings for the Nineteenth Year, 1880–81. Pph. 8vo, pp. 114. 1 plate. Boston, n. d.

1882. Abstract of Proceedings for the Twentieth Year, 1881–82. Pph. 8vo, pp. 88 (with two appended pamphlets by Prof. Lanza, pp. 50 and 8). Boston, 1882.

1882. In Memory of William Barton Rogers, LL.D., late President of the Society. Pph. 8vo, pp. 39, with portrait. Boston, 1882.

1883. Abstract of Proceedings for the Twenty-first year, 1882–83. Pph. 8vo, pp. 129. Boston, 1883.

1884. Abstract of the Proceedings for the Twenty-second year, 1883–84. Pph. 8vo, pp. 130. Boston, 1884.

1885. Abstract of the Proceedings for the Twenty-third year, 1884–85. Pph. 8vo, pp. 162. Boston, 1885.

1886. Abstract of the Proceedings for the Twenty-fourth year, 1885–86. Pph. 8vo, pp. 155. Boston, 1886.

1887. Abstract of the Proceedings for the Twenty-fifth year. Pph. 8vo, pp. 116. Boston, 1887.

1888. Abstract of the Proceedings for the Twenty-sixth year. 1887–8. Pph. 8vo, pp. 141. Boston, 1888.

1889. Abstract of the Proceedings for the Twenty-seventh year. Pph. 8vo, pp. 135. Boston, 1889.

1890. Abstract of the Proceedings for the Twenty-eighth year. Pph. 8vo, pp. 155. Boston, 1890.

1891. Abstract of the Proceedings for the Twenty-ninth year. Pph. 8vo, pp. 166. Boston, 1891.

The abstracts for 1879–81 were prepared by Prof. Lanza; for 1881–83 by Prof. Holman; for 1883–85 by Prof. Swain; for 1885–91 by Prof. Faunce.

1892+. Technology Quarterly and Proceedings of the Society of Arts, C. W. Andrews, Sec'y. Published four times during the year.

## PUBLICATIONS OF THE ALUMNI ASSOCIATION.

1876. Constitution, list of officers, list of alumni, with brief autobiographical notices. Pph. 8vo, pp. 36.

1877. Report of annual meeting; changes in addresses. Pph. 8vo, pp. 8.

1878. Constitution, list of officers, report of annual meeting, changes in addresses. Pph. 8vo, pp. 12.

1879. Constitution, list of officers, report of annual meeting, alumni directory.; also, some statistics collected by the Committee on the application for State aid. Pph. 8vo, pp. 19.

1880. Constitution, list of officers, report of annual meeting, alumni directory. Pph. 8vo, pp. 23.

1881. As in 1880. Pph. 8vo, pp. 24.

1882. Constitution, list of officers, etc. Pph. 8vo, pp. 8.

1883. Constitution, list of officers, etc. Pph. 8vo, pp. 12.

1884. Constitution, list of officers, etc. Pph. 8vo, pp. 8.

1885. Constitution, list of officers, etc. Pph. 8vo, pp. 8.

1886. Constitution, list of officers, etc. Pph. 8vo, pp. 8.

1887. Constitution, list of officers, etc. Pph. 8vo, pp. 10.

The title page of each of the above reads simply "Alumni Association of the Mass. Institute of Technology," with date.

1888. Publications of the Mass. Inst. of Technology and of its Officers, Students and Alumni. 1862–1887. Compiled by W. R. Nichols, 1882. Revised by L. M. Norton, 1888.

1888. Reports of the Committee on Amending the Constitution. Pph. pp. 4. n. d. Dec., 1888.
1888. Constitution, list of officers, etc. Pph. 8vo, pp. 12.
1889. Constitution, list of officers, etc. Pph. 8vo, pp. 12.
1890. Northwestern Association of the Mass. Institute of Technology. Pph. 12mo, pp. 11.
1891. Constitution, list of officers, etc. Pph. 8vo. pp. 9.
1892. Constitution, list of officers, etc. Pph. 8vo, pp. 12.

**PUBLICATIONS OF THE ARCHITECTURAL ASSOCIATION.**

1878. Constitution of the Architectural Association. Pph. 16mo, pp. 10. [Contains also a list of officers.]
Also, a circular (pp. 4) explaining the origin of the Association was circulated at the same time as the above.
1888. Architectural Review. First Number, Feb. 1888.
1891. Catalogue of Course IV. Exhibits. Pph. 8vo, pp. 60+, plates.
1892. Catalogue of Course IV. Exhibit. Pph. 8vo, pp. 60+, plates.
1890–. Two Hundred and Fifty Tracings from plates used in Course IV.

**PUBLICATIONS OF CLASS ASSOCIATIONS.**

1869. **Class of '69.** Mock Programme of Class Dinner. pp. 3.
1870. **Class of '70.** Oration (by C. R. Cross) and Poem (by S. D. Mason). Pph., pp. 8.
1871. **Class of '71.** Literary Exercises at the Graduating Supper. Pph. 8vo, pp. 22.
1878. **Class of '73.** Class Directory, 12mo. pp. 8.
1880. Class Directory. Pph. 12mo, pp. 8.
1882. Class Directory. Pph. 12mo, pp. 8.
1885. Class Directory. Pph. 12mo, pp. 16.
1886. Class Directory. Pph. 12mo, pp. 10.
1887. Class Directory. Pph. 12mo, pp. 10.
1888. Class Directory. Pph. 12mo, pp. 10.
1891. Class Directory. Pph. 12mo, pp. 10.
1892. Class Directory. Pph. 12mo, pp. 10.
1874. **Class of '74.** Constitution and By-Laws.
1875. Class History. 12mo. pp. 21.
1874–92. The Class has published an Annual Directory, generally

one sheet; also, various sheets containing poems and music written for the Association.

1886. **Class of '75.** History of the Class of '75. By E. A. W. Hammatt. Directory. Pph. 8vo, pp. 35. Boston.

1888. Historian's Report and Class Directory. Circ. pp. 3. Boston.

1875. **Class of '76.** Constitution and by-laws, and list of officers and members. Pph. 16mo, pp. 8.

1876. List of officers and members, report of Class dinner, constitution and by-laws, May 31, 1876. Pph. 8vo, pp. 32.

1877. Report of Annual Meeting, Oct. 31, 1877, and Class Directory. Pph. 8vo, pp. 18.

1878. Record and Directory, November, 1878. Pph. 8vo, pp. 59.

1879. Account of fourth Annual Meeting, Oct. 31, 1879, and Class Directory. Circular, pp. 3.

1881. Account of fifth Annual Meeting, Oct. 27, 1880, and Class Directory. Pph. 12mo, pp. 7. (Dated April 25, 1881.)

1883. A letter from the Secretary of the Class Association to the Members of the Class. Dec., 1883. Pph. 8vo, pp. 15.

1877. **Class of '77.** List of officers, constitution and by-laws, and directory of the Class Association. Pph. 16mo, pp. 12.

1878–79. Class Directory. Pph. 12mo, 1878, pp. 2; 1879, pp 3.

1880. Class Directory with autobiographical sketches, etc. Pph. 8vo, pp. 52.

1882. List of officers and Class Directory. Circular, pp. 3.

1883. Class Directory. Sheet.

1885. Class Directory. Pph. 8vo, pp. 25.

1886. Class Directory. Circular, 8vo, pp. 3.

1887. Class Directory. Pph. 8vo, pp. 21.

1890. Class Directory. Pph. 12mo, pp. 15.

1879. **Class of '79.** Exercises at the graduating supper of the Class, and constitution. Pph. 8vo, pp. 28.

1880–81. Class Directory. Two Pph. 8vo, pp. 4 each.

1882. Class Directory. Pph. 16mo, pp. 4.

1883. Class Directory. Pph. 16 mo, pp. 10.

1884. Class Directory. Pph. 16mo, pp. 15.

1885. Class Directory. Pph. 12mo, pp. 14.

1886. Class Directory. Pph. 12mo, pp. 9.

1887. Class Directory. Pph. 12mo, pp. 10.

1888. Class Directory. Pph. 12 mo, pp. 10.
1889. Class Directory. Pph. 12mo, pp. 9.
1890. Class Directory, etc. Cloth, 8vo, pp. 73.
1891. Class Directory. Pph. 12mo, pp. 15.
1892. Class Directory. Pph. 12mo, pp. 16.
1893. Class Directory. Pph. 12mo, pp. 15.
1880. **Class of '81.** "The Juniors, '81." A poem read at the Class supper, May 26, 1880.
1882. Class Directory, etc. Pph. 12mo, pp. 12.
1883. Class Directory, list of officers, etc. Pph. 12mo, pp. 8.
1884. Class Directory, etc. Pph. 12mo, pp. 8.
1885. Class Directory. Pph. 12mo, pp. 8.
1882. **Class of '82.** List of Officers, Class Directory, etc. Pph. 12mo, pp. 10.
1883–5. List of Officers, and Directory.
1884. **Class of '84.** First Annual Directory, June, 1884. Pph. 12mo, pp. 11.
1885. Second Annual Directory, March, 1885. Pph. 12mo, pp. 13.
1886. Third Annual Directory, March, 1886. Pph. sm. 8vo. pp. 13.
1887. Fourth Annual Directory, 1887, Pph. 12mo, pp. 12.
1888. Class Directory. Pph. 12 mo, pp. 14.
1889. Class Directory. Pph. 12mo, pp. 14.
1891. Class Directory. Pph. 12mo, pp. 16.
1892. Class Directory. Pph. 12mo, pp. 14.
1893. Class Directory. Pph. 12mo, pp. 16.
1886. **Class of '85.** The '85 Annual. Pph. 12mo, pp. 54.
1887. **Class of '86,** First Annual Directory. Pph. 8vo, pp. 36. Lawrence.
1892. Class Directory. Pph. 12mo, pp. 10.
1888. **Class of '87.** Souvenir of the Graduation of the Class of '87.

**SOCIETY OF MECHANICAL ENGINEERS.**

*Σ. M. E.* SOCIETY.— The *Σ. M. E.* Society, its origin, objects, etc. Pph. 12mo, pp. 16. Boston, 1883.

## PUBLICATIONS OF THE STUDENTS.

1873–74. The Spectrum. 3 vols. (8 nos. each). Vol. i published during second term of 1872–73; vols. ii and iii, 1873–74.

1881+. The Tech. 4to. 1st number. Nov. 16, 1881. Published every other Thursday during the school year. After 1891 weekly.

1885. Technique, 1885. Annual, published by members of the Junior Class of the Mass. Institute of Technology. Pph. 8vo. pp. 152 and xlvi.

1886. Technique, 1886. Pph. 8vo, pp. 160 and xl.

1887. Technique, 1887. Pph. 8vo, pp. 166 and xliv.

1888. Technique, 1888. Paper, 8vo, pp. 180 and xlvi.

1890. Technique, 1890. Cloth, 8vo, pp. 186 and xxxviii.

1891. Technique, 1891. Cloth, 8vo, pp. 246 and xxxviii.

1892. Technique, 1892. Cloth, 8vo, pp. 200 and xliii.

1893. Technique, 1893. Cloth, 8vo, pp. 284 and xl.

1887–9. Technology Quarterly, 8vo, 1st number Sept., 1887. Published four times during the school year; see M. I. T. Publications.

# PUBLICATIONS OF OFFICERS, STUDENTS AND ALUMNI.

**Allbright, William B.**, S. B., V. (M. I. T.) 1878.

1878. (With F. H. Morgan and J. G. Woolworth.) Sur l'action du chlorure d'éthyle sur la bensine en présence du chlorure d'aluminium. *Comptes rendus*, lxxxvi, 887.

**Allen, A. W.** (Stud. 1880–85.) (With L. M. Norton.)

1885. Ueber die Einwirkung der verdünnten Salpetersäure auf die Anilide. *Ber. d. chem. Ges.*, 18, 1995.

**Allen, C. Frank**, S. B., I. (M. I. T.) 1872. Asst. Prof. 1887–1889. Assoc. Prof. 1889 —.

1871. The Spectroscope. *Technologist*, —.

1872. Measurement of the Angular Deflection of Beams fixed at one End (*M. I. T.*) *Prest's Rep.*, 1872, 90–92.

1872. Apparatus for ruling Lines with a Diamond (*M. I. T.*). *Prest's Rep.*, 1872, 9.

Also various contributions to the newspapers upon Engineering and other topics.

1888. Safety of Steel Tired Wheels. *Railroad Gazette*, March 23, 1888, 183.

1889. Railroad Curves and Earth Work. Prepared for the use of civil-engineering students of Mass. Institute of Technology. Unbound, 8vo, pp. 172. Boston, 1889.

1890. A Course of Instruction in Railroad Management. *Tech. Quar.*, III., 238.

1890. A Course of Instruction in Highway Engineering. *Proc. Soc. Arts*, xxix, 59. Also *Engineering Record*, June 11, 1892, 28.

1891. Roads and Road Building. *Jour. Ass. Eng. Soc.*, x, 223.

1891. Annual Report of School Committee, Sharon, Mass.

1892. Annual Report of School Committee, Sharon, Mass.

1892. Easement Curves, *Eng. Rec.*, May 27, 1892, 381.

1893. Tables for Earthwork Computation. 8vo, pp. 38. Boston, 1893.

Various brief discussions in *Trans. Am. Soc. Civ. Eng.* and *Jour. Asso. Eng. Soc.*

**Allen, Charles F.**, S. B., III. (M. I. T.) 1876.

1876. The Port Henry Iron Industry. (Graduating Thesis.) Abstract in *M. I. T. Prest's Rep.*, 1876, 96.

1877. Silver Sandstones of Utah. *Eng. and Min. Jour.*, May 12, 1877.

1878. Mineral Resources of Utah. *Id.*, July 21, July 24, and Aug. 4, 1878.

**Allen, Charles R.**, S. B., V. (M. I. T.) 1885.

1885. (With W. R. Nichols.) Contributions to our knowledge of Sewage. *Jour. Frank. Inst.*, Aug., 1885.

1892. Laboratory Exercises in Elementary Physics. 12mo, pp. x + 209. New York, 1892.

**Allen, Walter S.**, S. B., V. (M. I. T.) 1879. Asst. 1882–83; Instr. 1883–85; Lecturer, 1885 —. (With G. R. Underwood.)

1883. Sur un produit de l'oxydation de la diéthylbenzine. *Bull. Soc. chim.*, xl. 100.

1885. Artificial Fertilizers. *Proc. Soc. Arts, M. I. T.*, 1888–89, 85.

1890. Election Statistics of Massachusetts. *Pub. of the Am. Statistical Association* N. S. No. 10, June, 1890.

1892. The State and the Lighting Corporations. *Annals Am. Acad. of Pol. and Soc. Sci.*, II. 131 March, 1892.

**Allis, Edward Phelps, Jr.**, Student, 68–71.

1889. The Anatomy and Development of the Lateral Line System in Amia Calva. *Jour. Morphology*, ii, No. 3, 463.

**Andrews, Clement W.**, A. M. Asst. 1883–84; Instr. 1884 —. Librarian 1889 —.

1886. (With L. M. Norton.) The Action of Heat on Liquid Paraffins. *Am. Chem. Jour.*, viii, 1.

1887. A List of the Periodicals in the Libraries of the various Departments of the Institute of Technology, April, 1887. Pph. 8vo, pp. 8.

1888. Influence of Temperature on the Specific Rotation of Cane Sugar. *Tech. Quar.*, ii, 367.

1888. Notes on the Determination of Sugar by the Polariscope. *Tech. Quar.*, ii, 372.

**Arms, Jennie M.**, Stud. 1866–68.

1877–8. Natural History in Primary Schools. *The Primary Teacher*, 1879–81.

1878–9. The Children's Discoveries. *Id.*, 1881–2.

1886. Observation Lessons on Animals. *The American Teacher*, 1886–7.

1889. Natural Science in Elementary Schools. *Pop. Sci. Mon.*, Mar. 1889.

(With Alpheus Hyatt.) Guide for Science Teaching No. VIII. Insecta.

1891. Clay Concretions of the Connecticut River. *Canadian Record of Science*, Jan., 1891.

**Atkinson, William P.**, A. M. Prof. and Librarian 1865–1890. Secy. of Faculty 1865–68.

1865. Classical and Scientific Studies, and the Great Schools of England. An Address before the Society of Arts, M. I. T. 8vo, pp. 117. Cambridge.

1868. English, 1868–69. Olla podrida topics. Syllabus of Topics, Pph. pp. 8.

1869. Address before the Sub-Committee of Boston School Board appointed to consider the Subject of a Reorganization of the Boston High Schools. Pph. 8vo, pp. 16. Boston.

1872–75, and 1877. Reports on the Instruction in English, etc. *Prest's Rep.*, 1872, 79–84; 1873, 27–38; 1874, 74–79; 1875, 7–8; 1877, 33–40.

1873. Vacation Reading. [Printed for the use of Students.] Pph. 8vo, pp. 4. Boston.

1873. Liberal Education of the Nineteenth Century. *Pop. Sci. Mon.*, iv, 1–26.

1878. List of Books. Pph. pp. 4.

1879. On the Right Use of Books. A Lecture. 12mo, pp. 65. Boston. 3d ed., 1879.

1882. Remarks on the late President Rogers. *Proc. Soc. Arts, M. I. T.*, 1882–83, 7–9.

1884. On History and the Study of History. Cloth, 12mo, pp. 107. Boston.

1887. On the Study of Literature. *Tech. Quar.*, 1, 96.

1888. Who made the Massachusetts Constitution? *Tech. Quar.*, ii, 101.

1890. Some of the Present Aspects of Education. *Tech. Quar.*, iii, 92.

**Austin, Amory**, S. B., V. (M. I. T.) 1873.

1879. Sur la diamylbenzine. *Bull. Soc. chim.* [**2**], xxxii, 12.

1885. Manganese. *Oil, Paint and Drug Reporter*, xxvii, 8.

1893. Rice: its cultivation, etc., in the U. S. and Foreign Countries. *Bulletin No.* 6, in Miscellaneous Series of Publications, Division of Statistics, U. S. Department of Agriculture.

**Avery, Charles E.** Stud. 1867–1869; Certif. Chem. 1869.

1868. Experiments with Paper Filters. *Am. Jour. Pharm.* [**3**], xvi, 200–205.

1868. On a modified Form of the Nitrate of Silver Test for Arsenic Acid. *Am. Jour. Sci.* [**2**], xlvii, 255–257.

1869. Decomposition of refractory Silicates by Fluorides in the Wet Way. *Chem. News*, xix, 270.

1881. The Manufacture of Lactic Acid. *Proc. Soc. Arts, M. I. T.*, 1880–81, 60–65.

1885. Getting rid of Mosquitoes. *Fla. Times Union*, May 8, 1885.

1887. Soda-Water Process. *Proc. Soc. Arts, M. I. T.*, 1886–87.

**Babb, Cyrus C.**, S. B., I. (M. I. T.) 1890.

1892. The Hydrography of the Potomac Basin. *Trans. Am. Soc. Civ. Eng.*, xxvii, 537.

1891. Water Storage on the Sevier River. *The Irrigation Age*, II.

**Bacon, Frank H.**, (Student 1875–77.)

1886. American Explorers in Assos. *The Century Magazine*, Oct., 1886.

**Baker, William H.**, S. B., I. (M. I. T.) 1869.

1880. Arch Bridges. *Van Nostrand's Eng. Mag.*, xxii, 33–40.

**Baker, David**, S. B., III. (M. I. T.) 1885.

1891. A New Method of Removing Skulls from direct Metal Ladles. *Trans. Am. Inst. Min. Eng.*, 1891.

1892. The Roch Drill applied to opening the Tapping Hole of a Blast Furnace. *Id.*, 1892.

**Bardwell, Fred L.**, S. B., V. (M. I. T.) 1884. Asst. 1884–1886. Instr. 1886 —.

1891. Laboratory Experiments in General Chemistry, by W. R. Nichols and L. M. Norton. Revised by F. L. Bardwell. Pph. 12mo, pp. 65. Boston, 1891.

**Barrows, Walter B.**, S. B., VII. (M. I. T.) 1876.

1876. Catalogue of the Alcidæ in the Museum of the Boston Society of Natural History, with a Review and Proposed Classification of the Family. [Graduating Thesis.] *Proc. Bost. Soc. Nat. Hist.*, xix, 150–165. Abstract in *Prest's Rep.*, 1876, 108.

1883. Flight of the Flying Fish. *Science*, I. 603.

1883. Birds of the Lower Uruguay. [Continued article.] *Bull. Nuttall Ornithol. Club*, VIII, Nos. 2, 3, 4.

1884. Birds of the Lower Uruguay. *The Auk*, I. 20. A series of papers begun in *Bull. Nuttall Ornithol. Club.*

1885. Plants in City Water. *Rep. Bd. Water Commissioners, Middletown, Conn.*, for the year 1885, pp. 10, 11.

1886. Accipitres or Birds of Prey. *The Standard Natural History*, IV. 260–348.

1887. The Sense of Smell in *Cathartes aura*. *The Auk*, IV. 172–174.

1887. Sparrows and Insects. *Forest and Stream*, xxviii, 490.

1887. Hummingbird and Sparrow. *Forest and Stream*, xxix, 23.

1887. Preliminary report on the relation of the English Sparrow to Agriculture. *An. Report of the U. S. Dept. of Agriculture for* 1886 [1887], p. 235.

1889. Preliminary report on the food of Crows. *An. Report of the U. S. Dept. of Agriculture for* 1888 [1889], pp. 498–535.

1889. The Rose-breasted Grosbeak and the Colorado potato beetle. *An. Report of the U. S. Dept. of Agriculture for* 1888 [1889], pp. 535–536.

1889. The English Sparrow in North America. Ornithological Bulletin No. 1, *U. S. Dept. Agriculture*, 1889, pp. 1–405, map and illustrations.

1891. Seed planting by birds. *Report of the Secretary of Agriculture for* 1890 [1891], p. 280.

1892. Economic work of the Ornithological Division of the U. S. Dept. of Agriculture. *19th An. Report of the N. J. State Board of Agriculture, July*, 1892, pp. 153–164.

1893. Food habits of the Horned Larks (*Otocoris.*) *Report of the Secretary of Agriculture for* 1892 [1893], pp. 193–197.

1893. Relation of Birds to Horticulture. *Proc. Western N. Y. Hort. Soc.* (*38th Annual Meeting, Jan.*, 1893), p. 50.

**Barrus, George H.**, S. B., II. (M. I. T.) 1874.

1874. The Swain Turbine. [Graduating Thesis.] Abstract in *Prest's Rep.*, 1874, 86–88.

1880. Report of Test on a Worthington Steam Pump. *Boston Jour. of Commerce*, Jan. 31, 1880.

1880. Relative Value of Anthracite and Bituminous Coal for Steaming Purposes. *Id.*, Nov. 13, 1880.

1880. Report of Tests on the Boilers of the Warren Thread Company — Steam Notes. Issued by Jarvis Furnace Co., Nov., 1880.

1880. Report of Tests on Compound Tubular and Common Tubular Boilers and a Buckeye Engine at Works of Hartford Carpet Company. Circular (pp. 4) issued by E. H. Ashcroft, Boston, Oct., 1880.

1881. Report of Tests on Jarvis Furnace at Works of Hartford Carpet Co. Circular (1 page) issued by Jarvis Furnace Co., Jan., 1881.

1881. Waste of Fuel in Manufacturing Establishments. Pph. sq. 12mo, pp. 20. Boston, 1881.

1882. The Advantages of Rapid Combustion in Steam Boilers. *Cincinnati Artisan*, Jan., 1882.

1882. Tests of Passenger Locomotives on the Boston and Albany. *R. R. Gazette*, Nov., 1882.

1883. The Tabor Indicator. Published by the Ashcroft Mfg. Co.

1886. A New Form of Steam Calorimeter. *Trans. Am. Soc. Mech. Eng.*, vii, 178.

1886. Another New Steam Engine Indicator. *Id.*, vii, 519.

1886. Substitutes for Steam. *Id.*, vii, 731.

1886. Smoke-Preventing Furnaces. *Id.*, vii, 796.

1886. The New Calorimeter. *Id.*, viii.

1886. Tests of Radiators. Pph. pp. 16. New York, 1886. (Nason Mfg. Co.)

1888. An Electric Speed Recorder. *Trans. Am. Soc. Mech. Eng.*, ix, 377.

1888. The Effect of Circulation in Steam Boilers on the Quality of the Steam. *Id.*, ix, 489.

1888. Memoranda on the Performance of the Compound Engine. *Id.*, ix, 515.

1888. Steam Boiler Tests. *Proc. N.E. Cotton Mfg. Ass.*, 1888, 34.

1889. Philosophy of the Multi-Cylinder or Compound Engine. *Trans. Am. Soc. Mech. Eng.*, xi, 167.

1889. Report of Week's Test of Harris Corliss Compound Engine at Howland Mill, New Bedford. Pph. pp. 21.

1889. Duty Trials of Pumping Engines. *Jour. Ass. Eng. Soc.*, viii, 365.

1890. A Universal Steam Calorimeter. *Trans. Am. Soc. Mech. Eng.*, xi, 790.

1890. Memoranda regarding the Indicator of the Engine of the Steamer "City of Richmond." *Id.*, xi, 828.

1890. Report of Tests of Baldwin Compound Locomotive on B. & O. R. R. Pph. pp. 55.

1891. Boiler Tests. pp. 280. Boston, 1891.

**Bartol, George,** S. B., III. (M. I. T.) 1877.

1890. Recent Developments in Iron and Steel Manufacture, *Jour. Ass. Eng. Soc.* ix, 14.

**Barton, George H.,** S. B., III. (M. I. T.) 1880. Asst. 1880–1881, 1883–1886. Instr. 1886 —.

1880. (With W. O. Crosby.) Extension of the Carboniferous Formation in Massachusetts. *Am. Jour. Sci.* [3], xx, 416–420.

1881. Geology of Norfolk County Basin. *Science Observer*, iii, 41.

1884. Notes on the Lava Flow of 1880–81 from Mauna Loa. *Science*, iii, 410–413.

1887. (With W. O. Crosby.) On the Great Dikes at Paradise near Newport. *Proc. Bost. Soc. Nat. Hist.*, xxiii, 325.

1888. Drift in Portions of Middlesex County. *Tech. Quar.*, ii, 316.

1889. Geology of Sudbury, Mass. *History of Sudbury, Mass.*, pp. 644–652.

1893. Formation of Bowlders *in situ* Medford, Mass. *Tech. Quar.*, v.

**Batchelder, John L., Jr.,** S. B., VII. (M. I. T.) 1890.

1892. (With W. T. Sedgwick.) A Bacteriological Examination of the Boston Milk Supply. *Bost. Med. Sur. Jour.*, Jan., 1892.

**Batcheller, Birney C.**, S. B., II. (M. I. T.) 1886.

1891. Development of the Dynamite Gun. *Eng. Mag.*, Sept., 1891.

1892. Notes on the English Proving Ground at Shoeburyness, *Jour. of U. S. Artillery*, i, 2.

**Beal, Foster E. L.**, S. B., I. (M. I. T.) 1871.

1874. Assembling among Moths. *Am. Nat.*, viii, 235.

1880. Tardigrades and their Eggs. *Id.*, xiv, 593.

1881. Crow Blackbird Eating Crayfish. *Id.*, xv, 904.

1881. Migration of Sandhill Cranes. *Id.*, xv, 142.

1881. A Shower of Cyclops Quodricornis. *Id.*, xv, 736.

1881–2. Familiar Birds of Iowa. A series of twenty-three papers published in *Iowa State Register*, Des Moines, Iowa.

1882. The Marsh Wren. *Iowa Homestead*, Des Moines, Iowa.

1882. About Bats. *Id.*

1882. A Chapter on Snakes. *Id.*

1882. How Farmers should treat the Birds. *Chicago Herald.*

1882. The English Sparrow. *Id.*

1882. The Usefullness of the Seed-eating Birds. *N. Y. Tribune.*

1882. A true Sapsucker. *Nuttall Bulletin*, vii, 54.

1882. Polygamy Among Orcines. *Id.*

1882. Nesting Habits of the Horned Lark. *Am. Nat.*, xvi, 240.

1886. Notes on Bird Migration at Chicago. *Id.*, xvi, 817.

1886. Twigs killed by Telephone Wires, *Id.*, xvi, 806.

1892. Investigation of the Food Habits of the *Ampelis cedrorum*. *Report of the U. S. Dept. of Agriculture*, 1892.

**Binney, Harold**, S. B., VI. (M. I. T.) 1888.

1890. Direct from Alternating Currents. *Elec. Power*, ii, 6.

1890. Collectors and Commutators. *Id.*, ii, 17.

1892. Molecular Movement in a Conductor. *Trans. Am. Inst. Elec. Eng.*, Feb., 1892.

**Bixby, William H.**, Capt. U. S. A. (Student 1866–67.)

1879. Graphical Computing Table — Text and Plate. 16mo. pp. 29. 1 plate. New York. 2nd edition. Plate, 1892.

1876. New York Fire Alarm System. 4to, pp. 10+. (Essayons Club papers.) H. S. Engineer Batallion Press.

1879. Graphical method for finding readily the real roots of Numerical Equations of any degree, if containing but one variable. 8vo, pp. 10. New York. (2nd edition, 1892.)

1880. Hollow Brick; Interpolation in Series; Foundations, and Graphic Tables for construction of Masonry Arches. 8vo, pp. 25. Washington.

1886. New Ordnances and Armor Material in Europe in 1881. 4to, pp. 24, with plates. New York.

1887. Charleston Earthquake of 1886. Report of Examination of Injured Buildings. Pph. 8vo, pp. 12. Wilmington, N. C.

1885–87. Annual Reports, River and Harbor Work: — in North Carolina and South Carolina for 1885, 6, 7, 8, 9, 90, 1; and Massachusetts, Rhode Island, and Connecticut in 1892. See Annual Reports Chief of Engineer U. S. Army. Each 8vo, about 80 pp.

**Blackwell, Ethel B.**, S. B., VII. (M. I. T.) 1891.

1892. Tests on Women of the Red Coloring Matter of the Blood. *N. Y. Med. Jour.*, Nov. 19, 1892.

**Blodgett, Aaron D.**, II., S. B. (M. I. T.) 1876.

1883. (With G. W. Blodgett.) Electric Signal Clocks. *Jour. Frank. Inst.*, March, 1883.

**Blodgett, George W.**, S. B., I. (M. I. T.) 1873. Lecturer, 1885—.

1879. Production and Transmission of Power by Electricity. *Proc. Bost. Soc. Civ. Eng.*, i, 27–32. *Van Nostrand's Magazine.* August, 1879.

1881. Railroad Signals. *Id.*, i, 104.

1883. Electric Signal Clock. *Proc. Soc. Arts., M. I. T.*, 1882–83, 54.

1883. Time Signals. *Jour. Ass. Eng. Soc.*, ii (1883).

1883. (With A. D. Blodgett.) Electric Signal Clock. *Jour. Frank. Inst.*, March, 1883.

1885. Recent Improvements in Electric and Inter-locking Railway Signals. *Proc. Soc. Arts., M. I. T.*, 1884–85, 62–67.

1885. The Boynton Train Indicator. *Id.*, 1884–85, 122.

1885. Application of Electricity to R. R. Signalling. *Jour. Ass. Eng. Soc.*, iv.

1886. Report of Sub-Committee on the Franklin Institute Exhibition. *Jour. Frank. Inst.*, Jan., 1886. [Letter on R. R. Signals.)

1887. Lighting of Railway Trains. *R. R. Gazette*, April, 1887.

1887. Automatic Signals on the Boston and Albany. *Id.*, June, 1887.

1887. Electric Lighting of Passenger Trains. *Proc. Am. Inst. Elec. Eng.*, 1887.

1887. Poisoning by Ivy. *Bost. Med. Sur. Jour.*, Aug., 1887.

1887. Lighting of Railway Stations. See Report of M. Weissenbruck, to the International Railway Congress at Milan.

1888. Station Distant Signals. *R. R. Gazette*, Nov. 1888.

1889. Palmer's Audible Signal. *Id.*, May, 1889.

1890. Notes on Hall's Automatic Signal. *Id.*, Aug., 1890.

1891. Rail-circuit and Wire-circuit Signals. *Id.*, Sept., 1890.

1891. Recent Improvements in Railroad Signalling. *Proc. Soc. Arts.*, 1890-91, 150.

1892. Lights for Semaphore Signals. *R. R. Gazette*, Aug., 1892. Illustrations of Railroad Signals. Pl. 201.

**Bosworth, William W.**, Stud. 1885-87.

1886. Illustrations in the *American Architect.*

1892. Articles in the *San Francisco Arch't News.*

**Bragg, Lottie A.**, S. B., V. (M. I. T.) 1890.

1890. (With Ellen H. Richards.) The Distribution of Phosphorus in the Products of Modern Milling. *Tech. Quar.*, iii, 246.

**Brandeis, Louis D.**, LL. B., Lect. 1892-.

1892-3. Business Law. Pamphlets published for the use of the students. 8vo. Complete in ten pamphlets and seven sheets. pp. 194. Boston.

**Brewster, B. E.**, S. B., III. (M. I. T.) 1872.

1872. (With C. S. Ward.) Report of Experiments on a Queen-post Truss. *Prest's Rep.*, 1872, 86-88.

**Brooks, Frederick**, Stud. 1868-70. Certif. Civ. Eng. 1870.

1876-91. About twenty short papers, reports and other communications, relating mostly to Metrology. *Proc. Boston Soc. Civ. Eng.*, 20, 109. *Jour. Ass. Eng. Soc.*, ii, 313, 22; iv, 27; vi. 272; ix, 23. *Trans. Am. Soc. C. E.*, xi, 408; xv, 381. *Am. Soc. C. E.*, xvi, 64; xvii, 115. *Proc. Am. Metrological Soc.*, ii, 3, 138, 193; iv, 220; v, 17, 84, 92, 110. *Eng. News*, etc.

1878. Decimal and other Arithmetical Notations. *Van Nostrand's Eng. Mag.*, June, 1878.

1879. The Metric Reform. *Scribner's Monthly*, July, 1879.

1884. The Theory of Polar Planimeter. *Jour. Ass. Eng. Soc.* iii, 294.

1886. Comparative Size of Metric and Old Mints with reference to Convenience. *Id.*, v, 225.

1888. Sewage Disposal at Medfield, Mass. *Id.*, vii, 235. Also *Report of State Board of Health of Mass.* 1887, 99.

**Brown, C. Leonard,** Stud. 1884–89.

1888. (With W. O. Crosby). Gahnite or Zinc-Spinel from Rowe, Mass. *Tech. Quar.*, i, 408.

**Brunner, Arnold W.,** Student, 1877–79.

1884. Cottages, or Hints on Economical Building. New York, 1884.

1887. (With T. Tryon.) Interior Decoration. New York.

**Bryant, Henry F.,** S. B., I. (M. I. T.) 1887.

1891. Photography in Surveying. *Mech. News.*, July 1 1891.

1891. The Hindu and the Bacterium. *Id.*, 1891, 308.

1892. Experience with Marsh Mud. *Id.*, Mar. 15, 1892.

1892. Cements. *Id.*, 1892, 439.

1891. Plate Guides. *Engineering News*, xxv.

**Burns, P. S.,** Ph. D., Asst. 1886–88, Instr. 1888—.

1888. (With J. P. Grabfield.) Chemical Problems. 12mo, pp. 87. Boston, 1888.

1888. (With J. P. Grabfield.) Nitro-Benzyl Hydroxylamines. *Tech. Quar.*, ii, 123.

1891. (With Chas. S. Hull.) The Application of the Alpha-Suphonic Acid of Naphthalene to the Bating and Puring of Hydes and Skins. *Id.*, iv, 191.

1892. Reforms in the Nomenclature of Organic Chemistry. *Id.*, v, 229.

1893. Chemisches verhalten einiger dimolekularen nitrile. *Journal für P. aktische Chemie* (1893, 47, 3).

1893. Chemisches verhalten einiger dimolekularen nitrile [Inaugural-dissertation der Universitat Leipzig]. Pph. 8vo, pp. 33. Leipzig, 1893.

**Burrison, Henry K.,** S. B., I. (M. I. T.) 1875. Asst. 1877–80; Instr. 1880–.

1887. Geometrical Drawing and Elementary Projections. 16mo, pp. 69. Boston.

**Bush, J. Foster,** Stu. 1868–71.

1882. Gun-Shot Wound of Knee-Joint. *Bost. Med. Sur. Jour.*

1882. Penetrating Pistol Wounds of Brains. *Bost. Med. and Sur. Jour.*, cvi, 27.

18—. Structure of the Urethra. *Id.*,

18—. Unusual Case of the Lepsis in an Infant. *N. Y. Med. Jour.*

1883. Case of Nasal Diphtheria. *Bost. Med. Sur. Jour.*, cix, 61.

1883. Cases of Intestinal obstruction treated by means of the Rectal Tube. *Id.*, cviii, 97.

**Buttolph, Benjamin G.,** S. B., II. (M. I. T.) 1888.

1888. (With C. H. Peabody.) Flow of Steam in a Tube. *Tech. Quar.*, ii, 28.

**Cabot, John W.,** S. B., III. (M. I. T.) 1879.

1882. Note on Manganese in Bessemer Rail Steel. *Trans. Am. Inst. Min. Eng.*, x, 302–304.

1882. Discussion on Chemical Methods for Analyzing Rail Steel. *Id.*, x, 189.

1886. The Influence of Temperature in Steel-making on the Behavior of the Ingots in Rolling. *Id.*, xiv, 84.

1891. On Sulphur in Bessemer Steel. *Id.*, xix, 544.

1892. Equitable Taxation. Boston, 1892.

**Cabot, Samuel, Jr.,** Stud. 1867–1870. Certif. Chem. 1870.

1872. Determination of Chlorine. *Am. Chem.* iii, 11.

1875. Decomposition of Common Salt by Steam. *Id.*, v, 443.

1875. Some Notes on Aniline Black. *Id.*, vi, 202.

1875. Charles Emile Kopp. Biographical Notice. *Id.*, vi, 210–213.

1876. Notes on English Chemical Manufactures. *Id.*, vii, 14; *Jour. Frank. Inst.* [3], xxvii, 351–355.

1876. Action of Sulphur at high Temperatures on Normal Paraffins. *Am. Chem.*, vii, 20.

Also several translations in *American Chemist*, see Vol. v., pp. 192, 201.

**Calkins, Gary N.,** S. B., IX. (M. I. T.) 1890. Lect. 1890—.

1891. On Uroglena. *Report Mass. State Board of Health*, 1891, 645.

1891. The Beginnings of Science. *Tech. Quar.*, iv, 62.

1891. Some Results of Sanitary Legislation in England since 1875. *Id.*, iv, 328.

1891. On the Microscopical Examination of Waters. *Report Mass. State Board of Health*, 1891, 397.

1891. Some results of Sanitary Legislation in England since 1875. *Publications of American Statistical Association.* No. 14,

1891. Reports of Health and Vital Statistics. *Quar. Pub. Am. Stat. Ass.* Vol. ii, No. 16. 1891, 433.

1893. The Fiftieth Registration Report of Births, Marriages and Deaths in Massachusetts for 1891. *Id.*, iii, 273.

**Campbell, Harry H.**, S. B., III. (M. I. T.) 1879.

1886. The Homogeneity of Open Hearth Steel. *Trans. Am. Inst. Min. Eng.*, xiv, 358.

1890. The Physical and Chemical Equations of the Open Hearth Process. *Id.*, xix. 128, and xx, 229.

1893. The Open Hearth Process. [Paper read at World's Engineering Congress.] *Id.*, 1893.

**Carpenter, Geo. R.**, A. B., Asso. Prof. 1890–93.

1889. The Episode of the Donna Pietosa. *Eighth Annual Report of the Dante Society*, Cambridge, Mass.

1890. Elementary Exercises in Rhetoric and English Composition. Privately printed. Paper, 8vo, pp. 38. Boston, 1890.

1891. A Translation of Dante's Eleven Letters, by C. S. Latham. Edited by G. R. Carpenter. 8vo, pp. 284. Boston, 1891.

1891. Exercises in Rhetoric and English Composition. Cloth, 8vo, pp. 133; 2nd ed. pp. 143, Boston.

1891. (*a*) Documents concerning Dante's Debts. (b) Documents concerning Dante's Public Life. Part I. Compiled by G. R. Carpenter. *Tenth Annual Report of the Dante Society.*

1892. Documents concerning Dante's Public Life. Part II. Compiled by G. R. Carpenter. *Eleventh Annual Report of the Dante Society.*

1893. Exercises in English, Selected and Classified, for Criticism or Correction, by H. D. Strang. Revised, with Additions, by G. R. Carpenter. Cloth, 8vo, pp. 146. Boston, 1893.

**Carson, Howard A.**, S. B., I. (M. I. T.) 1869.

1879. Methods of Excavation for Deep Trenches. *Proc. Bost. Soc. Civ. Eng.*, i, 11.

1880. Some Topics in regard to Sewerage. *Proc. Soc. Arts, M. I. T.*, 1880–81, 10–17.

1881. Separate *versus* Combined Sewers. *Sanitary Engineer*, iv, 142.

1889. Report on the Sewerage of the Mystic and Charles River Valleys, to the Mass. State Board of Health. *Senate Doc., No.* 2.

1891. Report of the Chief Engineer. *2nd An. Report of Metropolitan Sewerage Commission.*

1892. Report of Chief Engineer. *3rd An. Report of Metropolitan Sewerage Commission.*

1893. Report of Chief Engineer. *4th An. Report of Metropolitan Sewerage Commission.*

**Carter, Henry H.**, S. B., I. (M. I. T.) 1877.

1889. Farm Pond Conduit. [Boston Water Works.] *Jour. of Eng. Soc.*, viii, 73.

1892. Settlement of Embankment between Squantum and Moon Island. [Boston Main Drainage Works.] *Jour. Eng. Soc.*, xi, 355.

1892. Stony Brook Improvement. *Id.*, xi, 501.

**Chandler, Francis W.**, Prof. 1888–.

1888. A Few Hints about Drainage. *Tech. Quar.*, ii, 127.

1890. (With G. Lanza, G. F. Swain and S. H. Woodbridge.) The Engineering Building. *Proc. Soc. Arts*, 1888–9, 129.

1892. Construction Details. Prepared for the use of Students of the Mass. Institute of Technology. Pl. 25. Boston, 1892.

1892. Notes on Limes, Cements, Mortars, and Concretes. Prepared for the use of Students of Mass. Institute of Technology in the Architectural Department. Pph. 8vo, pp. 41. Boston, 1892.

**Chandler, Joseph E.**, Stud. 1885–87.

1892. The Colonial Architecture of Maryland, Pennsylvania and Virginia. Portfolio. Boston, 1892.

**Chase, Harvey S.**, S. B., II. (M. I. T.) 1883.

1883. Troublesome Electricity in Cotton and Woolen Mills. *Cotton, Wool and Iron*, May, 1883.

1884. Report on Power Tests of Cotton Machinery. Pph. (with tables.)

1889. Experiences with a Springer Cupola. *Am. Gas. Light Jour.*, L, 308.

1892. Magnetic Concentration of Iron Ore. *Tech. Quar.*, v, 64.

1892. The Chase Magnetic Ore-Separator. *Trans. Am. Inst. Min. Eng.*, June, 1892.

**Chase, Roscoe L.**, S. B., V. (M. I. T.) 1884.

1888. Finishing Cotton Goods. A series of articles in the *Textile Record*, beginning Aug., 1888, p. 233.

1889. Wool-Scouring Done Right. *Id.*, Feb., 1889.

1889. Dyeing with Florine. *Textile Colorist*, 1889, 54.

1889. Woolen-Yarn Scouring Done Right. A series of articles in *Textile Record*. July, 1889.

1889. How to Scour Woolen Piece Goods Properly. *Id.*, x, 336.

1889. How to Bleach Wool Properly. *Id.*, x, 369.

1890. Bleaching Wool. Hydrogen Peroxide as a Bleacher. *Id.*, xi, 205.

1890. A Revolution in Dyeing. *Jour. Frank. Inst.*, cxxx, 377. 437.

**Cheney, Margaret S.**, Stud. 1876–82.

1877. (With Mrs. Richards. A new and ready Method for the Estimation of Nickel in Pyrrhotites and Mattes. *Am. Jour. Sci.* [3]. xiv, 178–181.

**Clark, Fredrick W.**, S B., III. (M. I. T.) 1880. Asst. 1882–1883; Instr. 1883–1887; Asst. Prof. 1887–89.

1885. Lixiviation and Amalgamation Tests. *Trans. Am. Inst. Min. Eng.*, xiv. 395,

1887. Notes on Assaying of Lead, Silver, and Gold, Pph. 8vo, pp, 40, Brookline,

1887. Notes on Assaying of Lead, Silver, and Gold. *Tech. Quar.*, i, 228, 330,

1888. (With R. H. Richards). The Summer School of Mines, *Proc. Soc. Arts, M. I. T.* 1888–89. 40.

1889. Some Tests on the Relative Strength of Nitroglycerine and other Explosives. *Trans. Am. Inst. Min. Eng.*, xviii. 515.

**Clark, H. W.**, Stud. 1885–87.

1888. (With A. Hazen.) Effect of Temperature upon Deter-

mination of Ammonia by Nesslerization. *Am. Chem. Jour.*, xii, 425.

1891. (With A. Hazen). On the Determination of Nitrates in Water. *Jour. Anal. Chem.*, v, 301.

**Clark, Theodore M.**, A. B. Prof. 1881–88.

1883. Badly Crystallized Wrought Iron. *Science*, i, 169.

1883. The Architect as a Sanitarian. *San. Eng.*, Sept. 6, 1883. Also in *American Architect.*

1883. Building Superintendence. A Manual for Young Architects. 1 vol. 8vo, pp. 336. Boston.

1885. Recent Improvements in Building. *Proc. Soc. Arts, M. I. T.*, 1884–5, 5–11.

1887. Building Laws and their Enforcement. *Tech. Quar.*, 1, 79.

1887. Building Laws and their Enforcement. *Id.*, i. 208.

**Clifford, Harry E.**, S. B., VI. (M. I. T.) 1886. Asst. 1886–88 *Instr.* 1888— .

1887. The Efficiency of Small Electro-Motors. *Tech.. Quar.*, i, 24.

1887. The Efficiency of Small Electro-Motors. *Proc. Am. Acad.*, XIV. 493.

1888. Note on Efficiency of Electro-Motors. *Tech. Quar.*, ii, 275.

1890. Harcourt's Pentane Standard Lamp. *Id.*, iii, 167.

1893. Theory of Electricity. Pph. pp. 115. Boston, 1893.

1893. Derived Electrical Units. Lith, 8vo, pp. 83+.

**Clough, Albert L.**, S. B., VI. (M. I. T.) 1891.

1892. The Clough Battery Cut-out, *Elec. World*, xix, 171,

1892. A Thermal Method of Measuring Electric Currents. *Id.*, xix, 260.

**Coles, Stephen L.** Stud. 1887–89.

1890. The Wire Industry. *Industrial Suppl. to Elec. Rev.*, June 14, 1890.

1892. A Submarine Search-Light. *Elec. Rev.*, Aug. 27, 1892.

1893. A Visit to the World's Fair. *Id.*, Feb. 25, 1893.

**Collins, Edward, Jr.**, S. B., VI. (M. I. T.) 1888. Asst. 1888–90 Inst. 1890—.

1888. The Magnetic Circuit. *Tech. Quar.*, ii, 385.

**Cooley, Helen**, S. B., V. (M. I. T.) 1887.

1887. Comparison of the Methods of Testing Indigo. *Tech. Quar.*, i, 113. Also

1888. *Jour. Anal. Chem.*, ii, 129.

**Crafts, James M.**, S. B., Prof. 1870–1880 (non-resident 1874–80); 1892 —.

1870. (With C. Friedel.) Recherches sur les combinations du silicium avec les radicaux alcoholiques. *Ann. ch. et phys.* [**4**], xix, 334–367.

1870. The Ethers of Arsenic Acid and Arsenious Acid. *Am. Jour. Sci.* [**2**], 1, 10–21; *Bull. soc. chim.*, xiv, 99–106.

1871. (With R. Silva.) The Preparation and Properties of the Oxide of Triethylphosphine. *Am. Chem.*, ii, 83–88; *Bull. soc. chim.*, xvi, 43–55.

1872. Report on Instruction in Quantitative Analysis. *M. I. T. Prest's Rep.*, 1872, 30–34.

1873. Report on Chemical Laboratories for 3d and 4th year students. *M. I. T. Prest's Rep.*, 1873, 59–60.

1873. The Estimation of Iron with Hyposulphite of Sodium. *Am. Chem.*, iii, 441–446.

1877. (With C. Friedel.) Sur une nouvelle méthod générale de synthèse d'hydrocarbures, d'acétones, etc. *Comptes rendus*, lxxxiv, 1392, 1450; lxxxv, 74.

1877. (With C. Friedel and E. Ador.) Synthèse de l'acide benzoique et de la benzophénone. *Id.*, lxxxv, 672.

1877. (With E. Ador.) Action de l'oxychlore de carbone sur le toluène en présence de chlorure d'aluminium. *Id.*, lxxxv, 1163.

1878. (With C. Friedel.) Nouvelle méthode générale de synthèse organique. [Conférence de M. Friedel.] *Rev. Scientifique*, [**2**] xii, 820–825.

1878. (With same.) Fixation directe de l'oxygène et du soufre sur la benzine et sur le toluène. *Comptes rendus*, lxxxvi, 884.

1878. (With same.) Fixation directe de l'acide carbonique, de l'acide sulfureux, de l'anhydride phtalique sur la benzine; syn-

thèse de l'acide benzoique, de l'hydrure de sulphophényle et de l'acide benzoylbenzoique. *Id.*, lxxxvi, 1368.

1878. (With same.) Action of Aluminum Chloride on Petroleum. *Chem. Ind.*, 1878, 411.

1878. Sur une nouvelle forme de thermomètre à air. (Expériences.) *Ann. chem. et phys.* [**5**], xiv. 409–426.

1879. (With E. Ador.) The Action of Phthalic Anhydride on Naphthalene in the Presence of Chloride of Aluminum. *Am. Chem. Jour.*, i, 267–270; *Comptes rendus*, lxxxviii, 1355.

1879. (With C. Friedel and E. Ador.) Sur quelques dérivés du durol (alpha-tétraméthylbenzine). *Id.*, lxxxviii, 880.

1880. Sur la densité du chlore à de hautes températures. *Id.*, xc, 183.

1880. Sur la densité de quelques gaz à une hautes temperature. *Id.*, xc, 309.

1880. On the relative Densities of permanent Gases at high Temperatures. *Am. Chem. Jour.*, ii, 98–107.

1880. (With Fr. Meier.) Sur la densité de l'iode à des températures élevées. *Comptes rendus*, xc, 690.

1880. (With same.) The Vapor Density of Iodine. *Am. Chem. Jour.*, ii, 108–130.

1880. Sur un procédé pour la mesure des températures élevées. *Comptes rendus*, xc, 690.

1880. (With Fr. Meier.) Sur la densité de vapeur de l'iode. [This is the complete memoir.] *Bull. soc. chim.*, xxxiii, 501.

1880. Quelques remarques sur la densité de vapeur de l'iode. *Id.*, xxxiv, 130.

1880. (With C. Friedel.) Synthèse de l'hexaméthylbenzine et de l'acide mellique. *Comptes rendus*, xci, 257.

1880. Sur l'elévation du point zéro dans les thermomètres à mercure. *Id.*, xci, 291.

1880. Sur la cause des variations des points fixe dans les thermomètres. *Id.*, xci, 370.

1880. Sur les variations du coëfficient de dilatation du verre. *Id.*, xci, 413.

1880. Sur quelques questions thermomètriques. *Id.*, xci, 574.

Also, several editions of A Short Course of Qualitative Analysis. 12mo, pp. 133. [1st ed., New York, 1869.]

1881. (With C. Friedel.) Ueber die Verbindungen von Phtalsäurean hydrid mit den aromatischen Kohlenwasserstoffen. *Comptes rendus*, xcii, 833.

1882. Ueber die Depression des Nullpunkts bei Quecksilberthermometern. Id., xciv, 1298.

1882. Ueber die Genauigkeit des Messungen am Quecksilberthermometer. Id., xcv, 910.

1884. Ueber den Gebrauch des Quecksilber-thermometers mit besonderer Beziehung auf die Bestimmung von Schmelz- und Siedepunkten. *Am. Chem. Jour.*, v, 307.

1884. (With C. Friedel.) Einwirkung des Methylenchlorids auf Toluol und Benzol. *Bull. soc. chim.*, xli, 322.

1884. (With C. Friedel.) Ueber eine neue, allgemeine Methode der Synthese aromatischer Verbindungen. *Ann. chim. phys.*, i, 449.

1884. (With C. Friedel.) Ueber die Zersetzung der Sulfonsäuren vermittelst wässriger Schwefelsäure. *Bull. soc. chim.*, xlii, 66.

1884. (With C. Friedel.) Zersetzung der sulfonsäuren durch Erhitzen mit Schwefelsäure-hydrat. *Am. Chem. Jour.*, vi, 182.

1885. (With C. Friedel.) Ueber die Zerlegung gewisser Kohlenwasserstoffe durch Aluminiumchlorid. *Comptes rendus*, c, 692.

1886. (With C. Friedel.) Ueber ein Verfahren der Analyse gemengter aromatischer Kohlenwasserstoffe. *Comptes rendus*, ci, 1218.

1887. Ueber die Correctionen der Siedepunktstemperaturen bei wechselndem Barometerstand. *Berichte der Deutschen Chemischen Gesellschaft*, xx, 709.

1887. (With C. Friedel.) Ueber die Einwirkung des Chlormethyls auf Orthodichlorbenzol bei Gegenwart von Chloraluminium. *Ann. chim. phys.*, x, 411.

1887. (With C. Friedel.) Einwirkung von Methylenchlorid auf methylirte Benzole bei Gegenwart von Chloraluminium. *Ann. chim. phys.*, xi, 263.

1888. Ueber eine Correction die an den Bestimmungen Regnault's des Gewichtes eines Liters der elementaren Gase anzubringen ist. *Comptes rendus*, cvi, 1662.

1888. (With C. Friedel.) Ueber die Dampfdichte des Aluminiumchlorids und über das Moleculargewicht dieser Verbindung. *Id.*, cvi, 1764.

1888. (With C. Friedel.) Ueber die Dichte des Chlors und über die Dampfdichte des Eisenchlorids. *Id.*, cvii, 301.

1888. (With C. Friedel.) Ueber die Dampfdichte des Galliumchlorids. *Id.*, cvii, 306.

1888. Ueber die Reinigung des Quecksilbers. *Bull. soc. chim.*, xlix, 856.

1889. (With C. Friedel.) Ueber eine neue allgemeine Methode der Synthese aromatischer Verbingungen. *Ann. chim. phys.*, xiv, 433.

1889. (With C. Friedel.) Ueber die Zerlegung der Sulfonsäuren vermittelst Phosphorsäure. *Comptes rendus*, cix, 95.

**Crosby, William O.**, S. B., VII. (M. I. T.) 1876. Stud. Asst. 1875–76; Asst. 1876–80; Instr. 1880–1883; Asst. Prof. 1883—.

1875. Light of the Sky. *Proc. Am. Acad.*, ix, 425–428.

1876. Geology of Eastern Massachusetts. [Graduating Thesis.] Abstract in *M. I. T. Prest's Rep.*, 1876.

1876. Report on the Geological Map of Massachusetts. Pph. 8vo, pp. 51. Boston.

1877. Notes on the Surface Geology of Eastern Massachusetts. *Am. Nat.*, xi, 577–587.

1878. Physical Geography and Geology of the Island of Trinidad. *Proc. Bost. Soc. Nat. Hist.*, xx, 44–55.

1879. Occurrence of Fossiliferous Boulders in the Drift of Truro, Cape Cod. *Id.*, xx, 136–140.

1879. A Possible Origin of Petrosilicious Rocks. *Id.*, xx, 160–169.

1879. Evidences of Compression in the Rocks of the Boston Basin. *Id.*, xx, 308–313.

1879. Bitumen. Abstract of a Lecture before the Boston Scientific Society. *Science Observer*, ii, 54, 55.

1879. Native Bitumens and the Pitch Lake of Trinidad. *Am. Nat.*, xiii, 229–246.

1879. How the Appearance of a Fault may be produced without Fracture. *Geol. Mag.*, **N. S.**, vi, 296–298.

1880. Distorted Pebbles in Conglomerate. *Proc. Bost. Soc. Nat. Hist.*, xx, 368–378.

1880. On the Age and Succession of the Crystalline Formations of Guiana and Brazil. *Id.*, xx, 480–497.

1880. Pinite in Eastern Massachusetts; its Origin and Geological Relations. *Am. Jour. Sci.* [3], xix, 116–122.

1880. Contributions to the Geology of Eastern Massachusetts. Occasional Papers. *Proc. Bost. Soc. Nat. Hist.*, iii 288. Colored map.

1880. (With G. H. Barton.) Extension of the Carboniferous Formation in Massachusetts. *Am. Jour. Sci.* [3], xx, 416–420.

1880. Biographical Sketch of Levi S. Burbank. *Proc. Bost. Soc. Nat. Hist.*, xxi, 49–51.

1880. Geology of Frenchman's Bay, Maine. *Id.*, xxi, 109–117.

1881. On the Absence of Joint-Structure at Great Depths and its Relations to the Forms of coarsely crystalline Eruptive Masses. *Geol. Mag.*, **N. S.**, viii, 416–419.

1881. Guides for Science Teaching. (Boston Society Natural History.) xii. Common Minerals and Rocks. Pph. 16mo, pp. 130. Boston.

1881. On the Classification of the Textures and Structures of Rocks. *Proc. Bost. Soc. Nat. Hist.*, xxi.

1882. The Mountains of Eastern Cuba. *Appalachia*, iii, 129–142.

1882. Elevated Coral Reefs of Cuba. *Proc. Bost. Soc. Nat. Hist.*, xxii.

1882. On the Classification and Origin of Joint Structures. *Id.*, xxii, 72–85.

1883. Origin of Continents. *Geol. Mag.* **N. S.**, x, 241–252.

1883. Probable Occurrence of the Taconian System in Cuba. *Science*, ii, 740.

1883. On the chasm called "Purgatory" in Sutton, Mass. *Proc. Bost. Soc. Nat. Hist.*, xxii, 434–436.

1883. Origin and Relations of Continents and Ocean Basins. *Id.*, xxii, 443–485.

1884. Chemical Geology (note). *Science*, iii, 59.

1884. On the relations of the Conglomerate and Slate in the Boston Basin. *Id.*, xxiii, 7–27.

1884. The Colors of Natural Waters. *Science*, iii, 445.

1885. Colors of Soils. *Proc. Bost. Soc. Nat. Hist.*, xxiii, 219–222.

1886. Guides to the Museum of the Boston Society of Natural History. Mineralogy. 8vo, pp. 184. Boston.

1886. Common Minerals and Rocks. 8vo, pp. 205. Fourth edition, Boston.

1886. Notes on Joint Structure. *Proc. Bost. Soc. Nat. Hist.*, xxiii, 243.

1886. (With G. H. Barton.) On the Great Dikes at Paradise near Newport. *Id.*, xxiii, 325–330.

1887. Tables for the Determination of Common Minerals. Cloth, 8vo, pp. 74. Boston. Second Edition, pp. 84. Boston, 1888.

1887. The Elevated Pot-Holes near Shelburne Falls, Mass. *Tech. Quar.*, 1, 36.

1887. Asphaltum and the Pitch Lake of Trinidad. *Swiss Cross*, i, 172.

1887. Methods of Instruction in Mineralogy and Structural Geology in the Mass. Institute of Technology. *Tech. Quar.*, i, 187.

1888. On the Joint-Structure of Rocks. *Tech. Quar.*, i, 243.

1888. Quartzites and Siliceous Concretions. *Tech. Quar.*, i, 397.

1888. (With J. T. Greeley.) Vesuvianite from Newbury, Mass. *Tech. Quar.*, i, 407.

1888. (With C. L. Brown.) Gahnite or Zinc-Spinel from Rowe, Mass. *Tech. Quar.*, i, 408.

1888. Geology of the Outer Islands of Boston Harbor. *Proc. Bost. Soc. Nat. Hist.*, xxiii, 488.

1888. Geology of the Black Hills of Dakota. *Proc. Bost. Soc. Nat. Hist.*, xxiii, 488.

1889. Physical History of the Boston Basin. Ten Lectures in the *Teacher's School of Science*. Pph. pp. 22.

1889. The Madison Bowlder. *Appalachia*, vi, 61.

1889. Relation of the Pinite of the Boston Basin to the Felsite and Conglomerate. *Tech. Quar.*, ii, 248.

1889. Geological Collections. Mineralogy (Guides to the Mu-

seum of the Boston Society of Natural History). Paper, 12mo, pp. 184. Boston.

1890. Composition of Tell or Boulder Clay. *Proc. Bost. Soc. Nat. Hist.*, xxv, 115.

1890. The Kaolin in Blandford, Mass. *Tech. Quar.*, iii, 228.

1891. On the Contrast in Color of the Soils of High and Low Latitudes. *Tech. Quar.*, iv, 36.

1892. Dynamical Geology and Petrography (Guide to the Geological Collections of the Boston Society of Natural History). Cloth, 8vo, pp. x and 302, with 86 plates. Boston, 1892.

1892. Geology of Hingham, Mass. (Abstract). *Proc. Bost. Soc. Nat. Hist.*, xxv, 499, with three colored maps.

1893. Geology of the Boston Basin: Part I., Nantasket and Cohasset. Occas. Papers. *Proc. Bost. Soc. Nat. Hist.*, iv, 177, with two colored maps, 4 plates, 23 cuts in the text.

**Cross, Charles R.**, S. B., IX. (M. I. T.) 1870. Stud. Asst. 1869–70; Instr. 1870–71; Asst. Prof. 1871–75; Prof. 1875 —.

1870. Oration read at Meeting of Class of 1870. 8vo, pp. 8.

1870. On the Focal Length of Microscopic Objectives. *Jour. Frank. Inst.* [3], lix, 401.

1871. Annual of Scientific Discovery for 1870. Edited by John Trowbridge, S. B., aided by W. R. Nichols and C. R. Cross.

1872. Researches on Mariotte's Law and the Dilatation of Gases. Translation from *Jamin's Cours de Physique.* Pph. 8vo, pp. 32.

1873. Report on Lecture Instruction in Physics. *M. I. T. Prest's Rep.*, 1873, 68–74.

1873. Course in Elementary Physics. 8vo, pp. 176. Boston.

1876. Notes of Lectures on Light in its Relations to Color. (Lowell Course, 1876.) pp. 25.

1878. Helmholtz's Vowel Theory and the Phonograph. *Nature*, xviii, 93.

1878 and 1881. Notices of various Exhibits at 13th and 14th Exhibition of Mass. Charitable Mechanics Association, in *Report of Exhibition, Remarks of Judges.*

1880. Permanent Record of Foucault's Pendulum Experiment. *Nature*, xxii, 240.

1880. (With W. T. Miller.) On the present Condition of Mu-

sical Pitch in Boston and Vicinity. *Am. Jour. Otology*, Oct., 1880.

1880. Researches upon the Vibrations of a Standard Tuning-Fork. Abstract of Paper by R. Koenig. *Id.*, Oct., 1880.

1880. On Tones produced by a Limited Number of Impulses. Abstract of Paper by R. Kohlrausch. *Id.*, Oct., 1880.

1880. Acoustic Phenomenon noticed in a Crookes's Tube. *Proc. Am. Acad.*, xvi, 153; *Am. Jour. Otology*, Jan., 1881.

1880. Some Acoustic and other Apparatus recently acquired by the Department of Physics. *Proc. Soc. Arts, M. I. T.*, 1879–80, 101.

1881. History of Musical Pitch. Review of Paper by A. J. Ellis. *Am. Jour. Otology*, Jan., 1881.

1881. Crookes's Vacuum Tubes. *Proc. Soc. Arts., M. I. T.*, 1880–81, 58.

1881. Barometric Measurements of Heights; Annual Address of the President of the Appalachian Mountain Club. *Appalachia*, ii, 201–239.

1881. Radiophony. Abstract of Papers by Mercadier, Preece, Bell, and others. *Am. Jour. Otology*, Jan., April, July, Oct., 1881.

1881. Production of Beats and Beat-Tones with Harmonic Intervals. Abstract of Paper by R. Koenig. *Id.*, July, 1881.

1882. On the Production of Harmonic Tones by Variation of a Fundamental Tone. Review of Paper by R. Koenig. *Id.*, Jan., 1882.

1882. Acoustics of the Voice. [Notes of four Lectures delivered before Boston School of Oratory.] Pph. pp. 4.

1882. On the Beats of Consonances of the Form h : 1. Abstract of articles by R. Bosanquet. *Id.*, Jan., 1882.

1882. History of the Theory of Beats of Mistuned Consonances. Review of Paper by Bosanquet. *Id.*, Jan., 1882.

1882. Phenomena of Binaural Audition. Review of Paper by S. P. Thompson. *Id.*, April, 1882.

1882. Note on Complementary Colors. *Nature*, xxvii, 150.

1882. On Induction. A Letter to *Telegraphic Journal and Electrical Review*, xi, 4–15.

1882. Acoustical Observations. Review of Paper by Lord Rayleigh. *Am. Jour. Otology*, July, 1882.

1882. Sound Shadows in Water. Review of article by J. LeConte. *Id.*, July, 1882.

1882. Function of Two Ears in Perception of Space. Review of article by S. P. Thompson. *Id.*, Oct., 1882.

1882. Electric Lighting. Abstract. *Proc. Soc. Arts, M. I. T.*, 1881–82, 78–81.

1882. Underground Telephone Lines. A Report to the American Bell Telephone Company. Pph. 8vo, pp. 22. Boston.

1883. Remarks on the late President Rogers. *Proc. Soc. Arts, M. I. T.*, 1882–83, 24–28.

1883. Report on Fire Alarm Signals, presented to the Boston Tariff Association, Oct. 23, 1883. Pph. 8vo, pp. 11.

1884. Report on Buell Automatic Alarm, Jan. 24, 1884. Pph. 8vo, pp. 2.

1884. Report on Experiments with Brush Storage Battery. *Electrician* (London), Feb. 9, 1884.

1884. Secondary Batteries. Review. *Science*, Jan. 11, 1884.

1884. The Determination, History, and Present Standards of Musical Pitch. *Proc. Soc. Arts, M. I. T.*, 1883–84, 107–111.

1884. Lockwood's Electricity. Review. *Science*, iii, 729.

1884. Fiske's Electricity. Review. *Id.*, iv, 19.

1884. Report to Boston Tariff Association on System of Martin Automatic Fire Alarm Co. Oct. 20, 1884. Circular, pp. 2.

1884. [Lecture Notes on] Mechanics. 8vo, pp. 56. n. d.

1884. [Lecture Notes on] Optics. 8vo, pp. 60. n. d.

1885. Some New Apparatus for Studying Telephone Currents, *Proc. Soc. Arts, M. I. T.*, 1884–85, 120.

1885. A School for Electrical Engineering in Boston. *Science*, vi, 150.

1885. Electric Measuring Apparatus. Note. *Id.*, vi, 283.

1885. Notes on Acoustics; 1. Quality of sound as related to change of phase. 2. Remarks on a point in Helmholtz's Theory of Consonance and Dissonance. 3. Intensity of sound as related to amplitude of vibration. 4. On a musical application of the Principle of Fatigue. Abstract in *Proc. Am. Ass. Adv. Sci.*, xxxiii, 111.

1885. On a proposed method for ascertaining the least number of vibrations necessary to determine Pitch. *Id.*, xxxiii, 112.

1885. Hartleben's Library of Electrical Technology (Elektrotechnische Bibliothek). Review. *Science*, v, 220.

1885. Electric Measuring Apparatus. *Electrical World*, Oct. 17, 1885.

1885. Notes on Equal Temperament and the Character of Musical Keys. *Proc. Am. Acad.*, xxi, 499.

1885. Kittler's Electrotechnical Handbook. Review. *Science*, vi, 447.

1885. Experiments with the Thermal Telephone. *Proc. Am. Acad.*, xxi, 257–261.

1885. (With James Page.) Measurement of the Strength of Telephone Currents. *Id.*, xxi, 248–256.

1886. Experiments on the Melting Platinum Standard of Light. *Id.*, xxii, 220.

1886. (With W. E. Shepard.) The Inverse Electromotive Force of the Voltaic Arc. *Id.*, xxii, 227.

1887. Acoustic Principles underlying the Art of Telephony. Lecture before Boston Electric Club. *Modern Light and Heat*, Nov. 24, 1887.

1887. The Acoustic Principles underlying the Art of Telephony. Report of Lecture before Boston Electric Club. *Modern Light and Heat.* Nov. 24, 1887, iii, No. 6, p. 265.

1888. (With A. W. Sabine.) Researches on Microphone Currents. *Proc. Am. Acad.*, xxiv, 94. Also *Tech. Quar.* ii, 257.

1888. (With A. S. Williams.) The Strength of the Induced Current with a Magneto-Telephone Transmitter as Influenced by the Strength of the Magnet. *Proc. Am. Acad.*, xxiv, 113 Also *Tech. Quar.*, ii, 265.

1888. Recent Studies in Telephony Prosecuted in the Rogers Laboratory of Physics. *Proc. Soc. Arts., M. I. T.*, 1888–89, 54.

1890. (With H. E. Hayes.) On the Influence of the Strength of the Magnet in a Magneto-Telephone Receiver. *Proc. Am. Acad.*, xxv, 233. Also *Tech. Quar.*, iii, 295.

1890. The Acoustic Principles underlying the Art of Telephony. [Lecture before N. Y. Electric Club.] *Elec. Rev.*, Feb. 8, 1890.

1890. Converter Test at the Mass. Institute of Technology. Letter to *Electrical World*, Feb. 1, 1890.

1890. A New Method of Study in Telephony. *Proc. Soc. Arts*, 1890–91, 49.

1890. On the Extent of the Excursion of the Electrodes of a Microphone Transmitter. *Proc. Am. Acad.*, xxv, 69. Also *Tech. Quar.*, iii, 216.

1891. (With Harry M. Goodwin.) Some Considerations Regarding Helmholtz's Theory of Consonance. *Proc. Am. Acad.*, xxvii. Also *Tech. Quar.*, iv, 304.

1892. (With M. E. Maltby.) On the Least Numbers of Vibrations. Necessary to Determine Pitch. *Proc. Am. Acad.*, xxvii, 222. Also *Tech. Quar.*, v, 213.

1893. (With G. V. Wendell.) On Some Experiments with the Phonograph, relating to the Vowel Theory of Helmholtz. *Proc. Am. Acad.*, xxvii. 27.

1893. (With Arthur N. Mansfield.) An Investigation of the Excursion of the Diaphragm of a Telephone Receiver. *Proc. Am. Acad.*, xxviii, 93.

**Currier, Charles F. A.**, A. M. Instr. 1891 —.

1893. Constitutional and Organic Laws of France. Supplement to *Annals of Am. Acad. Pol. and Soc. Sci.* Pph. pp. 77. Philadelphia.

**Curtis, Russell H.**, S. B., I. (M. I. T.) 1870. Stud. Asst. 1869–70.

1885. Annotated Statutes of the State of Illinois. Edited by M. Starr and Russell H. Curtis. 2 vols. Chicago, 1885.

1887. Supplement to preceding. 1 vol. Chicago, 1887.

1892. Supplement to preceding two editions. 1 vol. Chicago, 1892.

1887. National Corporations. 21 *Am. Law Review*, 258. Same article in substance. 24 *Am. and English Railroad Cases*, 21.

1887. An Abutter's Rights in a Street. 24 *Cent. Law Jour.*, 51.

1891. Important Federal Statutes Annotated. Chicago, 1891.

1893. Classification of Law. (A lecture published by the Kent Law School of Chicago.)

**Cutter, Louis F.**, S. B., I. (M. I. T.) 1886.

1887. Use of the Aneroid Barometer in Western Massachusetts by the U. S. Geological Survey. *Tech. Quar.*, i, 39.

1891. Plane Table Methods used by the U. S. Geol. Survey in Western Mass., *Jour. Ass. Eng. Soc.*, x, 358.

**Dana, Gorham,** S. B., I. (M. I. T.) 1892.

1893. Brick Pavements and Thaw to Test Them. *Good Roads*, Apr., 1893.

**Dickinson, H. N.,** Instr. 1891 —.

1892. Selections from English Authors. For the use of second year students. Pph. 8vo, pp. 76. Boston, 1892.

**Dewey, Davis R.,** Ph. D. Instr. 1887–8. Asst. Prof. 1888–89. Assoc. Prof. 1889–92. Prof. 1892 —.

1887. Municipal Revenue from Street Railways. *Pub. Am. Econ. Ass.*, ii, p. 551.

1887. A Syllabus on Political History since 1815, for the use of students of the Massachusetts Institute of Technology. 1887. pp. 75.

1888. Elementary Notes on Graphic Statistics. *Tech. Quar.*, ii, 89.

1888. Index to Reports of Labor Statistics for 1887. *Pub. Am. Statis. Ass.*, i, 165.

1888. Reviews of Gilman's Profit-sharing, and Pidgin's Practical Statistics. *Id.*, i, 220; 175.

1889. (With Charles H. Levermore.) Syllabus on Political History. Revised. pp. 116. 2d ed., 1893. pp. 142.

1889. The Study of Statistics. *Pub. Am. Econ. Ass.*, iv, 361.

1890. Review of Reports of State Board of Charity and Correction. *Pub. Am. Statis. Ass.*, ii, 237.

1890. Review of Reports on Health and Vital Statistics. *Id.*, ii, 246.

1890. Review of Emigration and Immigration by Richmond Mayo-Smith. *Ann. Am. Acad. Pol. and Soc. Sci.*, i, 156.

1890. Review of English Labor Statistics. *Pub. Am. Statis. Ass.*, ii, 68.

1891. Review of Year-books and Annuals. *Id.*, ii, 393.

1891. Review of Studies in Statistics, by G. Longstaff. *Ann. Am. Acad. Pol. Soc. Sci.*, ii, 652.

1891. Review of Keynes on Statistics. *Pub. Am. Statis. Ass.*, ii, 308.

1892. Statistics of Suicides in New England. *Id.*, iii, 158.

1892. News of the French Revolution in America. *New Eng. Mag.*, i, 84.
1892. Nativity of New England. *The Independent*, July 16, 1892.
1892. Relation of Social Reforms. *The Open Court*, July, 1892.
1892. Syllabus of Lectures on Economic Questions of Commerce. pp. 20.

**Dippold, G. Theodore**, Ph. D. Inst. 1886–91. Asst. Prof. 1891 —.
1888. Richard Wagner's Poem, "The Ring of the Nibelung," explained and in part translated. 16mo, pp. 240. New York, 1888. 2d ed., 1892.
890. Theories as to the original home of the Indo-European Race. *Tech. Quar.*, iii, 306.
1891. Great Epics of Mediæval Germany. Their contents and history. 16mo, pp. 323. Boston, 1882. 2d ed., 1891.

**Dodge, Chas P.**, S. B., IX. (M. I. T.) 1889.
1891 —. Editor *New England Real Estate Advertiser.*

**Dodge, Frank S.**, S. B., I. (M. I. T) 1875.
1887. Volcano of Kilanea Hawaii. *Am. Jour. Sci.*, cxxx, 98.
1893. Kilanea in Aug., 1892. *Id.*
Reports to the Surveyor General.

**Dodge, William B.**, S. B., I. (M. I. T.) 1872.
1872. Coefficients of Efflux. Paper in *M. I. T. Prest's Report*, 1872.

**Draper, George Otis**, Stud. 1883–87.
1889. Temples. *Textile Mfg. World*, May.
1889. Spindles. *Wade's Fibre and Fabric*, Nov. 30.
1890. Weaving. *Id.*, Jan. 18.
1890. Spindles. *South Atlantic*, Feb. 18.
1890. Spinning Rings. *Jour. of Commerce*, May 10.
1890. Spindles. *Id.*, July 5.
1890. Rings. *Manf. Rev.*, Apr.
1890. Spindles. *Id.*, July.
1890. Spindles. *Textile Record*, July.
1891. Traveller Clearers. *Manf. Rev.*, Jan.
1891. Separators. *Wade's Fibre and Fabric*, Oct. 10.
1891. Doffing Devices. *Id.*, Oct. 3.
1891. Spindles. *Manf. Rec.*, March.
1892. Warpers. *Jour. of Commerce*, March 26.

1892. Spinning. *Textile Manf. World*, Dec.

1889–93. Forty to fifty pamphlets on cotton machinery.

1893. Statistics for Cotton Manufacturers. pp. 76. Milford, Mass.

**Dore, Edgar S.**, S. B., I. (M. I. T.) 1875.

1891. Diagram for Approximate Sewer Calculations. *Jour. Ass. Eng. Soc.*, July, 1891.

**Drown, Thomas M.**, M. D. Prof. 1885 —.

1886. The Latest Development of the Bessemer Process or of the Blowing of Small Charges. *Proc. Soc. Arts, M. I. T.*, 1885–86, 141.

1886. Coal and Iron in Southwest Virginia. *Bradstreet's*, Aug. 7, 1886.

1887. Steel for Heavy Guns. A Review. *Tech. Quar.*, i, 91.

1887. Chemical Examination of Drinking Water. *Proc. Soc. Arts.*, 1887–88, 87.

1887. The Odor and Color of Surface Waters. *Jour. N. E. Water Works Ass.*, Dec., 1887. Also *Tech. Quar.*, i, 250.

1888. Loss on Ignition in Water Analysis. *Tech. Quar.*, ii, 132.

1888. A Funnel for Filtering Carbon. *Tech. Quar.*, i, 374.

1889. The Analysis of Water: Chemical, Microscopical and Bacteriological. *Jour. N. E. Water Works Ass.*, Dec., 1889.

1889. Review of Blair's Chemical Analysis of Iron. *Am. Chem. Jour.*, ii, 214.

1889. Influence of Silicon on the Determination of Phosphorus in Iron. *Trans. Am. Inst. Min. Eng.*, xviii, 90. Also *Tech. Quar.*, ii, 379.

1889. (With Henry Martin.) The Determination of Organic Nitrogen in Natural Waters by the Kjeldahl Method. *Tech. Quar.*, ii, 277.

1890. The Filtration of Natural Water. (Paper read before the Boston Soc. of Civil Engineers.) *Jour. Ass. Eng. Soc.*, ix, 356.

1890. The Chemical Examination of Water and the Interpretation of Analyses. *Report of the Mass. State Board of Health on Water Supply and Sewerage.* Part 1, 517.

1890. (With F. P. Stearns.) Discussion of Special Topics Relating to the Quality of Public Water Supplies. *Id.*, Part 1, 717.

1890. (With A. Hazen.) A Report of the Chemical Work of the Lawrence Experiment Station, including Methods of Analysis and Some Investigations of the Process of Nitrification. *Rep. of the Mass. State Board of Health on Water Supply and Sewerage.* Part ii, 707.

1890. Report to the Board of Health of the City of Boston on the Odors from the Bay State Gas Co.

1891. On the Amount of Dissolved Oxygen Contained in the Waters of Ponds and Reservoirs at Different Depths. *Rep. Mass. State Board of Health*, 1891, 373.

1891. The State Board of Health Map of Normal Chlorine in the Water of Massachusetts. *Proc. Soc. Arts.*, 1890–91, 161.

1891. The Effect of the Aëration of Natural Waters. *Rep. of Mass. State Board of Health*, 1891, 385.

1891. (With A. G. McKenna.) The Direct Determination of Aluminum in Iron and Steel. *Trans. Am. Inst. Min. Eng.*, xx, 242. Also *Tech. Quar.*, iv, 220.

1892. (With Geo. F. Eldridge.) The Volatility of Stannic Chloride. *Tech. Quar.*, v, 136.

1892. Review of Blair's Chemical Analysis of Iron. 2d ed. *Am. Chem. Jour.*, xiv, 70.

1892. Report to Board of Health of the City of Newport, R. I., on the Condition of its Water Supply. Pph. 8vo, pp. 26. Boston, 1892.

1892. Report to the City of Somerville, Mass., on the Odors from the Packing Houses.

1892. Report to the City of Winnepeg, Manitoba, on a New Water Supply.

1893. Report to the City of Galveston, Texas, on a Proposed Source of Water Supply.

**Dunklee, John B.**, Stud., 1886–88.

1892. Paper on the Iron Wharf at Fort Monroe, Va. *Trans. Am. Soc. Civ. Eng.*, Aug., 1892.

**Eldridge, Geo. F.**, S. B., V. (M. I. T.) 1892.

1892. (With Thomas M. Drown.) The Volatility of Stannic Chloride. *Tech. Quar.*, v, 136.

**Eliot, Charles W.**, A. M., LL.D. Prof. 1865–69.

1866. Description of the new Dynamometer of S. P. Ruggles. *Proc. Am. Acad.*, vii, 65–68.

1867. (With F. H. Storer.) A Manual of Inorganic Chemistry, arranged to facilitate the Experimental Demonstration of the Facts and Principles of the Science. 8vo. Boston, 1867; 2d ed., 1868.

1868. (With same.) A Compendious Manual of Qualitative Chemical Analysis. 8vo, 1st ed. (as "proof-sheets"), Boston, 1868. 2d ed., 1869.

1869. The New Education. *Atlantic Monthly*, xxiii, 203, 358.

**Emery, Fred P.**, A. M. Asst. 1887–88; Inst. 1888—.

1890. The Language of the "Life of Thomas Becket." *Tech. Quar.*, iii, 76.

1891. Notes on English Literature. Cloth, 8vo, pp. 155. Boston, 1891.

**Emmerton, Frederic A.**, S. B., V. (M. I. T.) 1872. Asst. 1877–79.

1872. Saccharimetry. *M. I. T. Prest's Rep.*, 1872, 102.

1873. On the Action of Tri-iodide of Phosphorus on Iodide of Ethyl. *Am. Chem.*, iv. 9.

1882. Discussion on Analyzing Steel Rails. *Trans. Am. Inst. Min. Eng.*, x, 200.

1887. A Rapid Method for the Determination of Phosphorus. *Id.*, xv, 93.

**Faunce, Geo.**, S. B., III. (M. I. T.) 1882.

1887. Determination of the Antimony in Hard Lead by Means of Specific Gravity. *Jour. Anal. Chem.*, i, 121.

1892. Electrometallurgy as applied to Silver Refining. *Jour. Frank. Inst.*, 1892.

**Faunce, Linus**, S. B., II. (M. I. T.) 1877. Asst. Prof. 1884—.

1886. Descriptive Geometry. Prepared for the use of the students of the Mass. Institute of Technology. Cloth, 8vo, pp. 48, with 16 plates. Boston.

1887. Mechanical Drawing. Cloth, 12mo, pp. 136, with 8 plates. Boston.

1888. Descriptive Geometry, Revised. Cloth, 8vo, pp. 54, with 16 plates. Boston, 1889.

1889. Mechanical Drawing, Revised and Enlarged. Cloth, 12mo, pp. 146, with 9 plates. Boston, 1889.

**Fearing, Clarence W.**, A. M. Inst. School Mech. Arts, 1879–1887.

1870. An Abbreviated Table of the Metric System. Card, pp. 2.

1885. A Concise Table of the Metric System. Card, p. 1.

**Fisher, Charles H.**, S. B., II. (M. I. T.) 1877. Inst. 1883–84; Asst. Prof. 1884–1885.

1885. Report upon Observations taken in Fourteen Cotton-Spinning Rooms in July, August, and September, 1884. From *Proc. N. E. Cotton Mfrs. Ass.* Pph. 8vo, pp. 26. Boston.

1886. Variations of the Humidity of the Atmosphere. A paper read before the Lowell Overseers and Artisans' Association. *Lowell Morning Mail*, Feb. 2, 1886, and in *Cotton, Wool and Iron*, Feb. 6 and 13, 1886.

**Fiske, Jonathan P. B.**, S. B., VI. (M. I. T.) 1889. Lect. 1891 —.

1893. Notes on Electric Motors. Pph. pp. 50, cuts 50. Boston, 1893.

**Flint, Bertram P.**, S. B., II. (M. I. T.) 1888.

1890. Strength of Steel. *Eng. News*, April.

1892. Efficiency of Worm Gearing. *Id.*, March.

**Flood, Samuel D.**, S. B., II. (M. I. T.) 1890.

1893. Applications of Electricity for Mining Purposes. (Address before the Illinois Institute of Mining Engineers. Springfield, Ill., Feb. 15, 1893.)

**Foss, Fred. E.**, A. M., S. B., I. (M. I. T.) 1886. Instr., 1891–93.

1892. Notes on Highways. Prepared for the use of students in the Mass. Institute of Technology. Unbound. 8vo. pp. 305. Boston, 1892.

**Fox, Frederick, Jr.**, S. B., V. (M. I. T.) 1885. S. M., Ph. D. (Leipzig). Asst. 1886–1888.

1887. On the Determination of Nitrates in Potable Waters by Grandval and Lajoux's Process. *Tech. Quar.*, 1, 54.

1890. Ueber Diorthodichlortolanderivate. (Inaugural Dissertation.) Leipzig, 1890. 8vo. pp. 27.

**Freeman, J. R.**, S. B., I. (M. I. T.) 1876.

1888. Percolation through Embankments. *Jour. Ass. Eng. Soc.*, vii., 489.

1889. Some New Experiments and Practical Tables relating to Fire Streams. *Jour. N. E. Water Works Ass.*, iv, 95.

1889. Experiments relating to Hydraulics of Fire Streams. *Trans. Am. Soc. Civ. Eng.*, xxi, 303.

1889. Fire-Stream Tables for use of Insurance Inspectors and Firemen. 12mo, pp. 60. Boston, 1889.

1889. Tests of some Full-size Spruce Mill Pillars. *Trans. Bost. Soc. Civ. Eng.*, Sept. 18, 1889.

1890. Flow of Water in Fire-Hose. (An Address at State Convention of Mass. State Firemen's Ass.) Sept., 1890. *Proc., M. S. F. Ass.*, 1890.

1890. Should Fire Services be Metered? *Jour. N. E. Water Works Ass.*, 1890, 27.

1891. The Nozzle as an Accurate Water Meter, *Trans. Am. Soc. Civ. Eng.*, xxiv, 492.

1891. Comparison of English and American Types of Factory Construction. Fire Proof Factory Buildings. *Jour. Ass. Eng. Soc.*, x, 19.

1892. Arrangement of Hydrants and Pipes for Protection of a City against Fire. *Jour. N. E. Water Works Ass.*, vii, 49.

1893. Construction of Steam Fire Pumps. "The Underwriter Pump." Pph. 40 pp. Boston, 1893.

**French, Hollis**, S. B., VI. (M. I. T.) 1889.

1891. Applicazione della Saldatura Electrica alla Fabbricazione dei Proiettilli. *L' Industria*, Milan, v.

1891. Le Dinamo Lemp. *Id.*, v.

1892. La Soudure Electrique. *L'Electricité*, Paris.

**Frost, H. V.**, S. B., V. (M. I. T.) 1882. Ph. D. (Gött.); Asst. 1882–84; Instr. 1884–89.

1888. Ueber die Condensation von Benzylcyanid und seinen Substitutionsproducten mit Aldehyden und mit Amylnitrit. (Inaugural Dissertation). Pph. 8vo, pp. 41. Göttingen, 1888.

1888. Ueber die Condensation von Benzylcyanid und seinen Substitutionsproducten mit Aldehyden und mit Amylnitrit. *Ann. d. Chem.*, 250, 156.

1888. Condensation of Benzyl Cyanide and its Substitution Products with Aldehydes and with Amyl Nitrite. *Tech. Quar.*, ii, 349.

**Fukuzawa, Stejiro,** S. B., I. (M. I. T.) 1888.

1888. Narrow Gauge *vs.* Standard Gauge Railway. *Tech. Quar.*, ii., 286.

**Fuller, Frank L.,** S. B., I. (M. I. T.) 1871.

1885. The Wellesley (Mass.) Water Works. *Jour. Ass. Eng. Soc.*, iv, 401.

1887. The Ware (Mass.) Water Works. *Jour. New Eng. Water Works Ass.*, Sept., 1887.

1888. The Indirect Income of Water Supplies. *Proc. Am. Water Works Ass.*, 1888.

1889. Report on Southborough Water Works. Pph. 8vo, pp. 10. Southborough, 1889.

1889. Report on a System of Sewers for Town of Revere, Mass. Pph. 8vo, pp. 22, map. Boston, 1889.

1890. Description of Covered Reservoir at Franklin, N. H. *Jour. New Eng. Water Works Ass.*, v, 161.

1890. The Laying of a Ten-inch Water Pipe in Leicester. *Id.*, iv, 190.

1891. Description of a Well to Supply the City of Waltham. *Id.*, vi, 183.

1892. Description of Water Works at Franklin, N. H. *Id.*, vii, 82.

1893. Report on a System of Sewers for the Town of North Andover. Pph. 8vo, pp. 7, map. Andover, 1893.

1893. Report to the Foxboro Water Supply District on the System of Works built for the supply of the district. Pph. 8vo, pp. 43. Boston, 1893.

**Fuller, G. W.,** S. B., V. (M. I. T.) 1890.

1891. Special Biological Work. *Rep. Mass. State Board of Health*, 1891, 620.

1891. The Differentiation of the Bacillus of Typhoid Fever. *Id.*, 1891, 637.

1891. The Specific Organisms of Typhoid Fever. *Tech. Quar.*, iv., 130.

**Fuller, William B.,** S. B., I. (M. I. T.) 1883.

1890. Storm Sewers at Duluth, Minn. *Eng. News*, Oct. 25th, 1890.

**Gale, Horace B.**, S. B., II. (M. I. T.) 1883.

1884. Experiments on the Efficiency of Incandescent Electric Lamps. *Van Nostrand's Eng. Mag.*, xxxi, 57–63.

1888. The Transmission of Power by Belting. *Jour. Ass. Eng. Soc.*, vii, 429.

1890. Theory and Design of Chimneys, etc. *Trans. Am. Soc. Mech. Eng.*, xi, 451.

1891. Some Properties of Confocal Ellipses and their Application to Mechanism. *Jour. Frank. Inst.*, cxxxi, 105.

1892. Efficiency of Hydraulic Passenger Elevators. *Trans. Tech. Soc. Pacific Coast*, ix, 7.

**Galloupe, Francis E.**, S. B., II. (M. I. T.) 1876.

1876. Certain Points in the Development and Practice of Modern American Locomotive Engineering. (Graduating Thesis.) *Jour. Frank. Inst.* [**3**], lxxii, 377–390; lxxiii, 21–28, 106–113, 161–173, 258–264, 307–315, 391–397. Abstract in *M. I. T. Prest's Rep.*, 1876, 84–89.

1885. Rapid Transit and Elevated Railroads: with a description of the Meigs Elevated Railway System. *Trans. Am. Soc. Mech. Eng.*, vii, 81.

1885. Spark Arresters. *Engineering*, London, March.

1885. Grate Surface of Locomotives. *Id.*, April 5.

1885. Rapid Transit in American Cities. *Id.*, April 10.

1885. Machinery Designing. *Mech.*, May.

1885. Locomotive Grate Surface as a Factor in Rapid Transit. *Id.*, Nov.

1885. The Stevens Furnace. Catalogue. (Steam Boiler Tests.)

1885. The Stevens Furnace. *Power*, Aug., and *Mech.*, Oct.

1885. Steam Boiler Trials. *Am. Eng.*, Dec. 17.

1885. Rapid Transit and Elevated Railways, with a description of the Meigs Elevated Railway System. *Trans. Am. Soc. Mech. Eng.*, vii, 81.

1886. Discussion on Meigs' Railway; History of Post Line Railways. *Id.*

1887. Report on Bussey Bridge Fractures. *Eng. News*, March 30.

1887. The Strong Locomotive. *Boston Herald*, May 10.

1887. Rapid Transit, New York and Boston facilities compared. *Street Ry. Gaz.*, July.

1887. Maverick Bank Manual, July 1, 1887. Chapter on Railroads, Boston Statistics and Electric Railway Notes.

1887. Growth of Boston Passenger Travel. *Eng. News*, Aug. 6.

1887. New Form of Street Rail. *Id.*, Aug. 20.

1887. Boston's System of Parks. *Id.*, Aug. 27.

1887. Boston's New Boulevard (Beacon Street and West End Land Co.). *Boston Sunday Herald*, Sept. 3.

1887. Engineering Enterprises in China. *Eng. News*, Sept. 17.

1887. City Transit. *Id.*, Oct. 1.

1887. Boston's West End Improvement. *Id.*, Oct. 22.

1887. Testing Boilers. *Master Steam Fitter*, Oct.

1887. Boston Heating Co's. Plant. *Eng. News*, Aug. 27, etc.

1887. The Sprague Electric Motor on Boston Street Railways. *Id.*, Oct. 22.

1887. The Warren Water Filter. *Id.*, Nov. 19.

1887. Boston's Street Railway Combination. *Street Ry. Jour. Sys.*

1887. The South Street Arch (New Bussey Bridge). *Railroad Gaz.*, Dec. 30.

1888. Steam Heating and Ventilating System of the Mass. Institute of Technology. *Eng. News*, Feb. 25, March 3.

1888. Smoke Prevention and Automatic Stoking. *Mech.*, Feb.

1888. Steam Boiler Test with Downward-Draught Furnace. *Jour. Frank. Inst.*, CXXV, 114.

1888. Boston Elevated Railway Petitions and Rapid Transit in Boston. *Eng. News*, Feb. 25.

1888. Boston Water Works, Fisher Hill Reservoir. *Id.*, March, 24.

1888. The Thomson-Houston Electric Co.'s Works at Lynn, Mass. *Id.*, June 30, July 7, 14.

1888. The Sturtevant Mill. *Mech.*, May.

1888. Electric Welding. *Eng. News*, May 5.

1888. An Index to Engineering Periodicals, 1883–87, inclusive: comprising Engineering, Railroads, Science, Manufactures and trade. 8vo, pp. 294, Boston, 1888.

1888. Boston Parkways. *Eng. News*, Sept.

1888. Electric Railways; their Progress and Cost. *Id.*, Oct.
1888. The Brunig Railway. *Id.*, Dec. 15.
1888. Aluminum. *Id.*, Feb.
1889. Electric Welding, Thomson Elec. W. Co. Expts. *Id.*, March 9, 23.
1889. Steam Boiler Test (Down-draft), at Suffolk Cordage Works. *Id.*, March 23.
1889. Street Railway Traffic Statistics. *Boston Sunday Herald*, March 16.
1889. The Rowell Asst. Stop for Railroads. *Eng. News*, May 11.
1889. Elevated Roads in Boston. *Id.*, April 6.
1889. The Electro-Matrix Printing Machine. *Id.*, April 3.
1889. The Portelectric Carrier. *Id.*, May 25.
1889. The Electric Railway. *Id.*, July 13.
1889. A Decade of Progress in Electricity. *Id.*, July 27.
1889. Standard Time; the 24 o'clock system. *Id.*, Aug. 17.
1889. West End Electric Railway. *Id.*, Aug. 10.
1889. Tests of a New Steam Boiler. *Id.*, Sept. 9.
1889. A London Water Co. *Id.*, Aug. 17.
1889. Shafting and Belting. *Boston Advertiser*, Sept. 28.
1889. The Ethridge Postmarking and Stamp Cancelling Machine. *Eng. News*, Oct. 5.
1890. The Decline of American Shipping. *Boston Herald*, Jan.
1890. Elevated Railroads, are they needed? *Boston Herald*, Jan. 2.
1890. Air Line Transportation (Telphorage). *Eng. News*, July 14.
1890. Lynn; its Prosperity and Future. *Lynn Daily Item*, March 21.
1890. The Fales Furnace. *Eng. News*, Mar. 22.
1890. Boston, Revere Beach and Lynn Railroad Station. *New Railroad Gaz.*, Sept. 1.
1890. Tide and Wave Motors (Starkenburg's). *Eng. News*, April.
1890. New French Excavating Railway. *Id.*, Sept. 27.
1890. Locomotive Engine on Downward Draft Principle. *Id.*, Aug. 2.

1891. Rapid Transit in Boston. *Id.*, March, 14.

1891. A General Index to *Engineering News* and *Am. Railway Journal*, from April, 1874, to Dec. 27, 1890, inclusive. 8vo. pp. 118, New York, 1891.

1892. A New Trolley Guide (Rowell-Galloupe's). *Elec. Review*, Jan. 9.

1893. The Abolishment of Grade Crossings. *Lynn Daily Item*, Jan. 2.

1893. Galloupe's General Index to Engineering Periodicals; from 1888–1892, inclusive, Vol. II., 8vo, pp. 350, Boston, 1893.

Also notes and editorials in various trade and engineering journals.

**Gardiner, Edward G.**, S. B., VII. (M. I. T.) 1882. Ph. D. (Leipzig). Asst. 1885–87; Instr. 1887–1892.

1884. Beiträge zur Kenntniss des Epitrichiums und der Bildung des Vogelschnabels. *Archiv. f. mikroscopische Anatomie*, xxiv.

1889. Notes on the Structure of the Quills of the Porcupine. *Tech. Quar.*, i, 392.

1891. The Origin of Death. *Tech. Quar.*, iv, 178.

**Gardner, J. B.** Stud., 1870–73.

1887. Record of the Service of the Forty-Fourth Mass. Volunteer Militia in North Carolina, August, 1862, to May, 1863. 8vo, pp. 380. Boston, 1893. Privately printed.

**Giles, J. Edward.** Stud. 1872–74.

1893. A New Form of Perimeter. *Archives of Ophthalmology*, Jan., 1893.

**Gill, Augustus H.**, S. B., V. (M. I. T.) 1884. Ph. D. (Leipzig). Asst. 1884–1886; Instr. 1886—.

1885. Determination of the Amount of Moisture in Cotton and of the amount reabsorbed. From *Proc. N. E. Cotton Mfrs. Ass.* Pph. 8vo, pp. 9. Boston.

1890. Beitrag zur Kenntniss des Orthodichlor Stilbens. [Inaugural Dissertation.] 8vo, pp. 22. Leipzig, 1890.

1891. Contribution to our Knowledge of Orthodichlorstilbene. *Tech. Quar.*, iv, 228.

1891. Note upon the Estimation of Sugar in Milk. *Jour. Anal. Chem.*, v. 652. *The Analyst*, xvii, 36.

1892. Modification of Schützenberger's Method for Dissolved Oxygen. *Jour. Anal. Chem.*, vi.

1892. Apparatus for the Estimation of Free and Albuminoid Ammonia in Water Analysis. *Id.*, vi, 669. Also *The Analyst*, xviii, 65.

1892. The Determination of Carbon Dioxide in the Air of Buildings. *Id.*, vi, 363. Also *The Analyst*, xvii, 184.

1892. Upon the Difficulty with which Water Parts with its Dissolved Oxygen. *Id.*, vi, 606. Also *Tech. Quar.*, v, 250.

1892. An Improved Pipette for Gas Absorptions. *Am. Chem. Jour.*, xiv, 231. Also *Fres. Zeit.*, xxxi, 292.

**Goodale, Charles W.**, S. B., III. (M. I. T.) 1875.

1889. (With W. A. Akers.) Concentration before Amalgamation for Low-Grade, Partially Decomposed Silver Ores, with Notes on the Flint Creek Mining District. *Trans. Am. Inst. Min. Eng.*, xviii, 242.

1889. Manganese Ores of Tombstone Dist., Arizona. *Id.*, xvii,

1890. Supplemented Papers on above subject. *Id.*, xviii.

**Goodnow, Geo F.**, M. S. Stud. 1888–89.

1891. Rate of Purification of Gas. *Am. Gas Lt. Jour.*, March, 1891.

1893. Sulphur in Purified Gas, *Id.*, Feb. 27, 1893.

**Goodwin, Harry M.**, S. B., VIII. (M. I. T.) 1890. Asst. 1890–1892; Instr. 1892 —.

1891. (With C. R. Cross.) Some Considerations Regarding Helmholz's Theory of Consonance. *Tech. Quar.*, iv, 304. Also *Proc. Am. Acad.*, iv, 304.

**Goss, W. F. M.**, Stud., 1890–91.

1885. An Outline of Technical Work for a Manual Training School. (Address before the National Educational Association.) *Proc. Nat. Educ. Ass.*, 1885.

1888. Bench Work in Wood. 8vo, pp. 161. Boston, 1888.

1891. A Cast Iron Pedestal Forge. *Am. Mach.*, Dec. 17, 1891.

1891. A New Triple Expansion Engine. *Mech.*, Dec., 1891.

1892. An Experimental Locomotive. (Paper before Am. Soc. of Mech. Eng.) *Proc. Am. Soc. Mech. Eng.*, xii.

1892. Purdue University. *Sci. Amer.*, May 14, 1892.

1892. Technical Schools of America. *Cassier's Mag.*, Aug., 1892.

1892. Preliminary Tests of the Purdue Locomotive, Schenectady. *Railroad Gazette*, Oct. 7, 1892.

1892. Purdue University Locomotive in Grades. *Eng. News.*, Sept. 22, 1892. Also *Railway Review*, Sept. 17, 1892.

1892. Crushing Tests of Stone. *Stone*, Nov., 1892.

**Grabfield, J. P.**, Ph. D. Asst. 1887–88.

1888. (With P. S. Burns.) Chemical Problems. 12mo, pp. 87. Boston, 1887.

1888. (With A. Einhorn). Zur Kenntniss der Paramethoxyphenylacrylsäure. *Ann. d. Chem.*, ccxliii, 362.

1888. (With P. S. Burns.) Nitro-Benzyl Hydroxylamines. *Tech. Quar.*, ii, 123.

**Greeley, J. T.** Stud. 1883–89.

1887. (With W. O. Crosby.) Vesuvianite from Newbury, Mass. *Tech. Quar.*, i, 407.

**Greene, Charles E.**, A. M. (Harv.), S. B., I. (M. I. T.) 1868. C. E. (Mich.).

1873–81. Reports on the Department of Engineering, University of Michigan. In *Prest's Rep., University of Michigan.*

1875. Graphical Method for Analysis of Bridge Trusses, extended to Continuous Girders and Draw-Spans. 8vo, pp. 80. New York.

1875–76. Graphical Analysis of Roof-Trusses. 13 papers in *Eng. News*, ii. and iii.

1876. Graphics for Engineers, etc. Trusses and Arches. Part I. Graphical Analysis of Roof-Trusses. Reprint of papers in *Eng. News.* 8vo, pp. 64. Chicago.

1876–77. Editorials in *Eng. News.*

1877. Arches considered graphically. 22 papers in *Eng. News*, iv.

1879. Graphics for Engineers, etc. Part II. Bridge Trusses. 8vo, pp. 177. Part III. Arches. 8vo, pp. 190.

1881. The Huron River Trestle Bridge at Ann Arbor, Mich., built by Charles E. Greene. *Trans. Mich. Ass. of Surveyors and Civ. Eng.* 1881. pp. 3.

1882. Foundations and Piers of the W. & L. E. R. R. Bridge across the Maumee River, at Toledo, Ohio. *Proc. Mich. Ass. Surv. and Civ. Eng.*, Jan., 1882.

1883. Water as a Source of Engineering Difficulty. *Id.*, Jan., 1883.

1883. Draw-Span over Torch River, Mich. *The Amer. Eng.*, v, March 9.

1884. Green Mountain Railway, Mount Desert Island. *Science*, iii, 415.

1884. The Cantilever Bridge at Niagara Falls. *Id.*, iii, 572–574.

1884. Shaft-sinking by Freezing. *Id.*, iv, 443.

1885. The Washington National Monument. *Id.*, v, 146–150.

1885. Creeping of Rails. *Id.*, v, 344.

1885. Economy of Fuel. *Id.*, v, 74.

1885. Tunnel-building in England. *Id.*, v, 100.

1885. Finding a Bore-hole. *Id.*, v, 295.

1885. John Bloomfield Jervis. *Id.*, v, 250.

1885. The Panama Canal. *Id.*, vi, 503.

1885. Utilization of By-products in Charcoal Burning. *Id.*, vi, 506.

1886. The Panama Canal. *Id.*, vii, pp. 277–281.

1888. Highway Bridges. *Proc. Mich. Eng. Soc.*

1888. Retaining Walls for Earth. Graphical Solution. *The Technic. U. of M.* Also *Eng. News*, Dec. 29.

1889. Bending Moments on Bridge Pins; Graphical Solution. *The Technic. U. of M.*

1890. Graphical Analysis of Roof Trusses, rewritten and revised. 8vo, pp. 80. New York.

1891. Parabolic Arch, Hinged at Crown only. *The Technic*, iv, 47.

1891. Notes on Part II. of Rankin's Civil Engineering. 8vo, pp. 124. Lithographed. Ann Arbor, 1891.

1892. The Arch: Its Action. *Proc. Mech. Eng. Soc.*

Also sundry minor notes and book notices in *Science.*

**Gregg, D. A.**, Lect. 1887 —.

Architectural Rendering in Pen and Ink. Complete in four parts. 1891–93. Plates.

**Haberstroh, Chas. E.**, Stud., 1871–74.

1890. Experiments on Flow of Water through Large Gates and over a Wide Crest. *Jour. Ass. Eng. Soc.*, Jan., 1890.

**Hale, Geo. E.**, S. B., VIII. (M. I. T) 1890.

1890. Photography of the Solar Prominences. *Tech. Quar.*, iii, 310.

1890. Note on Solar Prominence Photography. *Astronomische Nachrichten*, No. 3006.

1891. Researches on the Magnesia Fleeting in connection with the Spectra of the Nebulæ. *Sidereal Messenger*, x, Jan., 1891.

1891. Pending Problems in Spectroscopy. *Id.*, x, Feb., 1891.

1891. The System of the Stars. *Pub. Astron. Soc. of the Pacific*, iii, No. 16, 1891.

1891. Photography and the Invisible Solar Prominences. *Sidereal Messenger*, x, June, 1891.

1891. Kenwood Physical Observatory. *Id.*, x, Aug., 1891.

1891. Photographic Investigations of Solar Prominences and their Spectra. *Am. Jour. Sci.*, Aug., 1891.

1891. Results in the Solar Prominence Photography. *Astronomische Nachrichten*, No. 3053.

1891. The Ultra-Violet Spectrum of the Solar Prominences. (Read Cardiff Meeting British Ass. Adv. Sci., Aug., 1891.) *Am. Jour. Sci.*, Dec., 1881. *Memorie della Società degli Spettroscopisti Italiani.* Sept., 1891.

1892. Recent Results in Solar Prominence Photography. *Astronomy and Astro. Physics*, Jan., 1892.

1892. Spectroscopic Observations of the Great Sun-Spot Group of Feb., 1892. *Id.*, Apr., 1892.

1892. Solar Photography at the Kenwood Astro-Physical Observatory. *Id.*, May, 1892. *Memorie d. Soc. deg. Spett. Ital.*, May 1892.

1892. A Remarkable Solar Disturbance. *Ast. and Astro. Physics*, Aug., 1892. *Memorie d. Soc. deg. Spett. Ital.*, Aug., 1892.

1892. Recherches sur l'atmosphère solaire. *Comptes rendus*, June 13. *Memorie d. Soc. deg. Spett. Ital.*, June.

1892. Photographies de la chromosphère des protubérances et des facules solaires, à l'observatoire d'astronomie physique de Kenwood, Chicago. *Comptes rendus*, July 11, 1892. *Memorie d. Soc. deg. Spett. Ital.*, Aug.

1892. The Ultra-Violet Spectrum of the Solar Prominences. Part II. *Ast. and Astro. Physics*, Aug., 1892.

1892. Photographs of Solar Phenomena obtained with the Spectroheliograph of the Kenwood Astro.-Physical Observatory. *Id.*, Aug.

1892. Photographs of the Occultation of Mars by the Moon (July 11, 1892), made at the Kenwood Astro-Physical Observatory. *Id.*, Aug.

1892. The Yerkes Observatory of the University of Chicago. *Id.*, Nov., 1892.

1892. Some Results and Conclusions derived from a Photographic Study of the Sun. *Id.*, Nov., 1892. *Memorie d. Soc. deg. Spett. Ital.*, Dec.

1892. The Ultra-Violet Spectrum of the Solar Prominences. Part III. *Ast. and Astro. Phys.*, Nov., 1892. *Memorie d. Soc. deg. Spet. Ital.*, Nov., 1892.

1892. On the Condition of the Sun's Surface in June and July, 1892, as compared with the Record of Terrestrial Magnetism. *Ast. and Astro. Phys.*, Dec., 1892.

1893. On the Probability of Chance Coincidence of Solar and Terrestrial Phenomena. *Id.*, Feb., 1893.

1893. Les raies H et K dans le Spectre des facules solaires. *Comptes rendues*, Jan. 30, 1893.

1893. The Spectroheliograph. *Ast. and Astro. Phys.*, March, 1893.

1893. La Probabilité de Coïncidence entre les phenomènes terrestres et solaires. *Comptes rendues*, Feb. 6.

1893. Photography of the Solar Corona without an Eclipse. *Ast. and Astro. Phys.*, March, 1893.

**Hale, Richard A.**, S. B., I. (M. I. T.) 1877.

1888. Lawrence Dam across Merrimac River. *Jour. Ass. Eng. Soc.*, vii, 494.

**Hall, Francis P.**, S. B., V. (M. I. T.) 1882.

1883. On the Action of Certain Vegetable Acids on Tin. *Am. Chem. Jour.*, iv, 440–452.

**Handy, James O.**, Stud. 1884–86.

1892. A Rapid Method for Phosphorus Determination in Iron

and Steel Ores. (Paper read before Chemical Section of Engineer's Society of Western Pa.) *Jour. Anal. Chem.*, vi, 254.

1892. Sulphur in Coal and Coke. (Paper read before Chemical Section of Engineer's Society of Western Pa.) *Id.* vi, 611.

1892. (With A. E. Hunt and G. H. Clapp.) The Chemical Analysis of Aluminum. *Id.*, vi, 24.

**Hardman, John E.**, S. B., III. (M. I. T.) 1877.

1889. On the New Empress Stamp Mill at Renfrew. *Canadian Mining Review.*

1891–3. Gold Mining as an Industry in Nova Scotia. Annual article in *Canadian Mining Manual.*

1892. Recent Gold Milling Practice in Nova Scotia. *Trans. Min. Soc. of Nova Scotia*, i, Pt. 2.

**Hart, Francis R.**, Stud. 1889.

1890. The Reduction of Friction on Journals. *Elec. Eng.*

1891. The Determination of the Energy of Water-Powers. *Id.*, Nov. 18.

1892. The Long Distance Transmission of Power by Electricity. *Id.*, xiii, 42. Also, *Tech. Quar.*, v, *Elec. World*, Jan., 1892.

**Hart, Susan J.**, Spec. Stud. 1889–90.

1882. Natural Science for Common Schools. Pph. pp. 29. South Framingham, Mass., 1892.

**Harvey, Geo. L.**, S. B., II. (M. I. T.) 1888.

1892. Steel Car Construction. *Railroad Gazette*, Feb., 1892, 155.

**Haskell, Edw. A.**, Stud. 1883–85.

1891. Application of the Differential Calculus to the Determination of Frog Angles. *Railroad Gazette*, 1891, 393.

**Hayes, Harry E.**, A. B. (Harv.), S. B., VI. (M. I. T.) 1890.

1891. (With C. R. Cross.) On the Influence of the Strength of the Magnet in a Magneto Telephone Receiver. *Proc. Am. Acad.*, xxv, 233. Also *Tech. Quar.*, iii, 295.

**Hazen, Allen**, S. B., Stud. 1887–88.

1889. On the Determination of Chlorine in Water. *Am. Chem. Jour.*, xii, 409.

1889. Determination of Carbonic Acid in Water. *Tech. Quar.*, ii, 182.

1890. Apparatus for Determining Ammonia in Sand and Sewage. *Am. Chem. Jour.*, xii, 427.

1890. (With H. W. Clark.) Effect of Temperature upon the Determination of Ammonia by Nesslerization. *Id.*, xii, 425.

1890. (With T. M. Drown.) Report of the Chemical Work of the Lawrence Experiment Station, including Methods of Analysis and Some Investigations of the Process of Nitrification.

**Hayes, Hammond V.**, A. B. Stud. 1883–85.

1885. (With John Trowbridge.) Application of Photography to Electrical Current Measurements. *Am. Jour. Sci.*, 29, **N. S.**, 374.

1885. (With John Trowbridge.) On the Production of Alternating Currents by means of a Direct Current Dynamo-Electric Machine. *Id.*, 29, **N. S.**, 377.

1886. (With John Trowbridge.) Causes of Irregularity in the Action of Galvanic Batteries. *Id.*, 30, **N. S.**, 34.

1886. The Dynamic Action of an Electric Current. *Proc. Am. Acad.*, xxii.

**Henck, John B.**, A. M., Prof. 1865–81.

1873. Report of Excursion of Civil Engineering Students. *M. I. T. Prest's Rep.*, 1873, 39, 40.

1881. Appendix to Field Book for Railroad Engineers.

**Henck, John B., Jr.**, S. B., VIII. (M. I. T.) 1876. Asst. 1877–1880; Sec. 1890–91.

1876. On the Mean Specific Gravity of the Earth. (Graduating Thesis.) Abstract in *M. I. T. Prest's Rep.*, 1876, 112.

1876. New Map of the White Mountains. *Appalachia*, i, 26–29 (with map).

1876. The Application of Photography to Mountain Surveys. *Id.*, i, 96–100.

1876. Mt. Willey. *Id.*, i, 120, 121.

1876. Mt. Tremont. *Id.*, i, 124, 125.

1876–80. Reports as Secretary of the Appalachian Mountain Club. *Id.*, i, 107, 108 for 1876; i, 272 for 1877; ii, 61–63 for 1878; ii, 152, 153 for 1879; ii, 268–270 for 1880.

1881. A Visit to Milan as Delegate to the Fourteenth Annual Congress of the Italian Alpine Club, 1881. *Id.*, iii, 13–19.

**Henderson, J. A.**, Stud. 1869–71.

1874. The Theory of Aëro-Steam Engines. (Graduating Thesis.) *Jour. Frank. Inst.*, July, Aug. and Sept., 1874.

**Herrick, James A.**, S. B., V. (M. I. T.) 1872.

1878. Improvements in the Appliances for Venting Molten Steel or Iron from a Casting-Ladle or Shoe. *Trans. Am. Inst. Min. Eng.*, vii, 13–15.

1879. An Improved Universal Suspended Hydraulic Lift. *Id.*, vii, 303–307.

1880. The Eighty-Ton Steam-Hammer at Creusot. *Id.*, viii, 560–568.

**Hibbard, Henry D.**, S. B., III. (M. I. T.) 1877.

1890. Defects in Design of Open Hearth Furnaces. *Proc. Eng. Soc. West. Penn.*, vi, 161.

1891. Variations of the Open Hearth Process. *Iron Age*, July, 1891.

**Hibbard, Thomas**, S. B., II. (M. I. T.) 1875.

1874. Report on Experiments in the Institute Steam Laboratory. In Professor Whitaker's Report to the President. *M. I. T. Prest's Rep.*, 1875, 115, 116.

1875. The Construction of Gear-Teeth. (Graduating Thesis.) Abstract in *M. I. T. Prest's Rep.*, 1875, 115–117.

**Higgins, Edward E.**, S. B., VI. (M. I. T.) 1886.

1887. Efficiency of a Brush Storage Battery. *Tech. Quar.*, i, 107.

**Hodge, James M.**, S. B., III. (M. I. T.) 1872.

188?. (With A. R. Crandall.) Preliminary Reports of the Southeastern Kentucky Coal Fields. *Geol. Sur. of Ky.*

1893. The Big Stone Gap Coal-Field. (Paper read at Feb. 1893 meeting of Am. Inst. Min. Eng.)

**Hofman, Heinrich O.**, E. M., Ph. D. Asst. Prof. 1889–91. Asso. Prof. 1891 —.

1888. The Dry Assay of Tin Ores. *Trans. Am. Inst. Min. Eng.*, xvii, 498.

1888. Gold Milling in the Black Hills. *Id.*, xvii, 498.

1890. The Dry Assay of Tin Ores. I., II. *Tech. Quar.*, iii, 112, 261.

1892–3. The Metallurgy of Lead and the Desilverization of Base Bullion. 1st ed., New York, 1892. 2d ed., pp. 414, fig. 275. New York, 1893.

1892. Recent Progress in the Treatment of Argentiferous Lead Ores. *Univ. Indus.*, i, 321.

**Hollerith, H.**, E. M. Instr. 1882–1883.

1883. Statistics of Power used in Manufactures. Tenth Census of the United States. Washington.

1883. Two Forms of Dynamometer. *Proc. Soc. Arts, M. I. T.*, 1882–83, 56.

**Hollis, Frederick S.**, S. B., V. (M. I. T.) 1890.

1892. Kaolin in Ashland, Mass. *Tech. Quar.*, v.

1892. An Investigation of the Cause of the Color of Natural Water. *Report of the Boston Water Board*, 1892.

**Holman, Geo. U. G.**, S. B., VI. (M. I. T.) 1889.

1890. (With F. H. Safford.) Telephonic Specific Inductive Capacity. *Proc. Am. Acad.*, xxv, 1.

**Holman, Marie G.** (née Glover), A. B., S. B., V. (M. I. T.) 1881. Died, 1885.

1883. Tincture of Opium (Laudanum). *Am. Jour. Phar.*, Oct., 1883.

1885. Cleaning and Polishing Compounds. *Christian Union*, April, 1885.

1886. Food, and the Effect of Cooking. *Id.*, xxxiii, No. 3, p. 12.

1886. The Action of Yeast and Baking Powders. *Id.*, No. 4, p. 12.

1886. Domestic Poisons. *Id.*, No. 5, p. 12.

**Holman, Silas W.**, S. B., VIII. (M. I. T.) 1876. Asst. 1876–80; Instr. 1880–1882; Asst. Prof. 1882–1885; Assoc. Prof. 1885–93; Prof. 1893.

1876. On the Effect of Temperature on the Viscosity of Air. *Proc. Am. Acad.*, xii, 41–50.

1876. The Atomic Theory as applied to Gases. (Graduating Thesis.) Abstract in *M. I. T. Prest's Rep.*, 1876.

1876. Two new forms of Mountain Barometer. *Appalachia*, i, 25, 26.

1877. On a New Method of Studying the Relation between the Viscosity and Temperature of Gases. *Phil. Mag.*, iii, 81.

1882. Simple Method of Calibrating Thermometers. *Proc. Am. Acad.*, xviii, 157–162; *Am. Jour. Sci.* [**3**], xxiii, 278–283.

1882. Hypsometric Measurements of some Points about Williamstown, Mass. *Appalachia*, iii, 50–53.

1885. On the Effect of Temperature on the Viscosity of Gases. *Proc. Am. Acad.*, xxi, 1–44.

1885. On the Friction of Leather Belts on Iron Pulleys. *Jour. Frank. Inst.*, Sept., 1885.

1885. On the Effect of Temperature on the Viscosity of Gases. Pph. 8vo, pp. 53. Cambridge.

1885. Physical Laboratory Notes, Mass. Institute of Technology. Pph. 8vo, pp. 83. Boston. 2d ed., 1888, pp. xxviii, 132. 3d ed., 1890, 2 parts. Part I., pp. xxviii, 66; Part II., pp. 76. 4th ed., 1891, Part I., pp. xxviii, 67; 1892, Part II., pp. 102. 5th ed., 1892, Part I., pp. xxviii, 67; Part II., pp. 102.

1886. On the Effect of Temperature on the Viscosity of Air and Carbon Dioxide. (2 plates.) *Phil. Mag.* (5), xxi, 199.

1886. Lecture Notes prepared for the use of the Students of the Mass. Institute of Technology. Pph 8vo, pp. 52. Boston.

1887. Method for the Calibration of a Thermometer at many Points. *Tech. Quar.*, i, 16.

1887. A Regulator for Maintaining Constant Exhaustion. *Tech. Quar.*, i, 34.

1887. Discussion of the Precision of Measurements. *Tech. Quar.* i, 121, 194, 298.

1888. Discussion of the Precision of Measurement. Lecture Notes. Pph. 8vo, pp. 57. Boston. 2d ed., 1891, pp. 61.

1888. (With W. H. Gleason.) Boiling Points of Naphthaline, Benzophenone, and Benzol under Controlled Pressures, with Special Reference to Thermometers. *Proc. Am. Acad.*, xxi, 237. Also *Tech. Quar.*, ii, 1.

1889. Electric Lighting. The Arc and Incandescent Systems. *Boston Daily Advertiser*, Sept. 28, 1889.

1891. Mass. Institute of Technology. History of Higher Education in Massachusetts (U. S. Bur. of Educa.). By G. G. Bush. 8vo, pp. 280–319. Washington, 1891.

1891. Standard for the Resistence of Copper. *Elec. Eng.*, xii, 550.

1891. Appleton's School Physics. Chapters on Mechanics. 8vo, pp. 1–230. New York, 1891.

1892. Discussion of the Precision of Measurements. 8vo, pp. vii, 176. New York, 1892.

**Holton, Edward C.**, S. B., V. (M. I. T.) 1888.

1888. An Attachment for Stirrers used in Determining Melting Points. *Amer. Chem. Jour.*, xi, 216.

**Homer, E. B.**, S. B., IV. (M. I. T.) 1885. Instr. 1887–90; Asst. Prof. 1890 —.

1893. Stereotomy for Students of Architecture. In portfolio. Boston, 1893.

**Hopkins, William J.**, S. B., VI. (M. I. T.) 1886.

1893. Telephone Lines and their Properties. Cloth. 12mo, pp. 258. New York, 1893.

**Hosea, Raphael M.**, S. B., I. (M. I. T.) 1879.

1891. The Friction of Mine Car Wheels. (Results of a series of tests.) *The Colliery Engineer*, Jan., 1891.

1891. Entry Driving Machines. (Results of a test of the "Stanley Header.") *Id.*, May, 1891.

1893. Notes of a Flying Trip. (Paper read before Denver Soc. Civil Engineers.)

**Howard, Charles P.**, S. B., I. (M. I. T.) 1874.

1879. An Ascent of the Matterhorn. *Lippincott's Magazine*, Sept., 1879.

1885. The Refracting Telescope. *Pop. Sci. Mon.*, Dec., 1885.

1891. Orbit of the Companion of Sirius. *Astron. Jour.*, Feb. 4, 1891.

**Howe, Henry M.**, A. M. (Har.), S. B., III. (M. I. T.) 1871. Lecturer 1884 —.

1875. Blast Furnace Economy: on the Reduction of Carbonic Acid in Anthracite Furnaces. *Trans. Am. Inst. Min. Eng.*, iii, 332–351.

1875. What is Steel? *Eng. and Min. Jour.*

1876. Thoughts on the Thermic Curves of Blast Furnaces. *Trans. Am. Inst. Min. Eng.*, v, 330–346.

1876. The Calorific Power of Water Gas. *Eng. and Min. Jour.*, Nov., 1876.

1877. On the Nomenclature of Iron. *Trans. Am. Inst. Min. Eng.*, v, 515–528.

1878. A Direct Process in Copper Smelting. *Id.*, vii, 442–454.

1880. On two new Processes for the Extraction of Nickel from its Ores. *Id.*, ix, 6.

1882. (With W. C. Eustis.) Contributions to the Metallurgy of Nickel and Copper. *Id.*, x, 305–309.

1882. On the Comparative Efficiency of Fans and Positive Blowers. *Id.*, x, 482–490.

1883. A suggested Cure for Blast Furnace Chills. *Id.*, xi, 221, 450.

1883. A suggested Cure for Blast Furnace Chills. *Science*, i, 102. [Abstract.]

1883. Bessemerizing Mattes in a Reverberatory Furnace. *Eng. Min. Jour.*, March 17, 1883.

1883. Does Alumina act as a Base or an Acid in Singulo Silicate Slags? *Id.*, Nov. 17, 1883.

1883. The Metallurgy of Argentiferous Copper Compounds. *Rep. Director U. S. Mint*, 1883, 747.

1884. A Systematic Nomenclature for Minerals. *Trans. Am. Inst. Min. Eng.*, xii, 238.

1885. The Patience of Copper and Silver as affected by Annealing. *Id.*, xiii, 646.

1885. Remarks on the Cost of Mining and Milling Gold Ores in Nova Scotia. *Id.*, xiii, 668.

1885. Remarks on Continuous Regenerative Furnaces. *Id.*, xiii, 712.

1885. Use of Petroleum in the Blast Furnace. *Jour. Ass. Charcoal Iron Mfrs.*, June, 1885, 153.

1885. Some Defects in Technical Education: Address delivered before the Rose Polytechnic Institute on Commencement Day, 1885.

1885. Mining and Metallurgy at the Boston Exhibitions. *Eng. and Min. Jour.* Series of Papers.

1885. The Clapp-Griffiths Bessemer Plant. *Science*, vi, 342–344.

1885. Progress in Metallurgy. *Id.*, vi, 525.

1885. Copper Smelting. Bulletin No. 26, U. S. Geological Survey. Pph. 8vo, pp. 107. Washington.

1885. The Hunt and Douglass Copper Process. *Eng. and Min. Jour.*, Dec., 1885, 414.

1886. Contraction of Iron under Sudden Cooling. *Trans. Am. Inst. Min. Eng.*, xiv, 400.

1886. Remarks on the Clapp-Griffiths Process. *Id.*, xiv, 929, 934.

1886. The Relative Efficiency of Fans and Pressure Blowers. *Eng. and Min. Jour.*, Feb. 20, 1886.

1886. Bad Rails. *Id.*, May 29, 1886.

1886. The Effect of Slag on the Fibrousness of Avesta Steel. *Id.*, Sept., 1886, 218.

1886. The Elizabeth Copper Mine. *Id.*, Nov. 6, 1886.

1887. The Quality of Steel for Heavy Guns. *Id.*, Jan. 8, 1887.

1887. The Attainment of Uniformity in the Bessemer Process. *Trans. Am. Inst. Min. Eng.*, xv, 340.

1887. Steel for Warfare. *Proc. Soc. Arts, M. I. T.*, 1886–87, 13.

1887. Modern Manufacture of Steel. Continued under the title: The Metallurgy of Steel. *Eng. and Min. Jour.*, xliii. No. 10 (unfinished).

1887. Quality of Steel for Guns. *Eng. and Min. Jour.*, xliv, 26.

1887. Bessemer Steel Process. *Nation*, Dec., 1887, 438.

1889. Heat Treatment of Steel. Sibley College Lectures. *Sci. Am. Sup.*, April 6, 1889.

1888. Role of Aluminum in Mitis Castings. *Eng. and Min. Jour.*, xlv.

1888. The Oxidation of Silicon by Ferrous-Oxide. *Eng. and Min. Jour.*, xlv, 392.

1888. Momentary Depression of the Elastic Limit of Steel at Two Critical Temperatures. *Tech. Quar.*, ii, 136.

1888. A Supposed Oxycarbide of Iron. *Eng. and Min. Jour.*, xlv, 267.

1890. The Manufacture of Copper Sulphate. *Eng. and Min. Jour.*, xlix, 609.

1890. The Metallurgy of Steel. Cloth, 8vo, pp. 380. New York, 1890. Illustrated. Published first as a series of articles in *Eng. and Min. Jour.*

1890. Report on Metallurgical and Mining Congress at Paris. *Eng. and Min. Jour.*, xlix, 454.

1890. Report on Mining and Metallurgical Congress in Paris. *Id.*, xlix, 295.

1890. Recent Discoveries in Magnetism: Nickel, Steel. *Eng. and Min. Jour.*, xlix, 700.

1890. Curious Bessemer Practice. *Eng. and Min. Jour.*, xlix, 733.

1890. Automatic Apparatus for Controlling Bessemer Converters. *Id.*, l, 49.

1890. Plural Tests. *Id.*, l, p. 68.

1890. Hoffman's Kiln, adapted to Annealing Wire. *Id.*, l, 101.

1890. Bull's Metal and the Breaking-down Point. *Id.*, l, 121.

1890. French and Belgian Collieries. *Id.*, l, 129.

1890. Briquette Making in France. *Id.*, l, 126.

1890. Remarkable Work in Armor-Piercing. *Id.*, l, p. 159.

1890. Aluminum in Iron. *Id.* l, 213.

1890. Copper in Steel. *Id.*, l, 426.

1890. Preliminary Note on the Thermal Properties of Slags. *Trans. Am. Inst. Min. Eng.*, xviii, 724.

1890. Pyrometers and Pyrometric Data. *Eng. Min. Jour.*, xlix, 637, 675.

1890. Notes on the Bessemer Process. *Id.*, l, 383.

1890–91. Darby's Recarbonizing Process. *Id.* l, 470, 95, li, 472.

1890. Direct Processes: Semi-Sponge. *Id.*, l, 618.

1890. New Furnace Charging Devices. *Id.*, l, 214.

1890. Novelties in Open-Hearth Procedure. *Id.*, l, 305.

1890. Pyrometric Data. *Id.*, l, 426.

1890. The Adams Process for the Direct Production of Iron. *Id.*, l, 599, 643.

1890. Notes on the Bessemer Process, as carried out in Robert Vessels. *Id.*, l, 242.

1891. Manganese Steel. *Id.*, lii, 216. Also *Trans. Am. Soc. Mech. Eng.*, xii, 955.

1891. Notes on the Bessemer Process. *Trans. Am. Inst. Min. Eng.*, xix, 1120.

1891. Manganese Steel. *Jour. Frank. Inst.*, cxxxv, 114.

1891. Direct Combination of Iron and Carbon. li, 86. *Eng. and Min. Jour.*

1891. Why do Steel-Tired Wheels Wear Flat Less than Chilled Cast-Iron Ones? *Id.*, li, 93.

1891. Steel Cast Projectiles. *Id.*, lii, Oct., 1891, p. 581.

1892. Notes on Manganese Steel. *Trans. of the Amer. Inst. of Min. Eng.* Oct., 1892, p. l.

1892. Mukai on Manganese Steel. *Eng. and Min. Jour.*, p. 387.

**Howison, George H.**, A.M. Prof. 1872–79; Sec'y of Faculty 1879.

1873–74. Reports on Department of Logic and the Philosophy of Science. *M. I. T. Prest's Rep.*, 1873. 6–19; 1874, 6–13.

1875–77. Reports on Department of Philosophy. *M. I. T. Prest's Rep.*, 1875, 1–6; 1876, 40–49; 1877, 31.

1877. Philosophy at the Mass. Institute of Technology. *Jour. Spec. Philos.*, xi, 103–107.

1877. An Account of the Department of Philosophy in the Mass. Institute of Technology. Pph. 8vo, pp. 72. Boston.

**Hoyt, William E.**, S. B., I. (M. I. T.) 1868. Instr. 1870–77.

1876. Report on Instruction in Bridge and Roof Construction. *M. I. T. Prest's Rep.*, 1875, 65–71.

1885. The Hunt and Douglass Copper Process. *Eng. and Min. Jour.*, Dec., 1885, 414.

1886. Contraction of Iron under Sudden Cooling. *Trans. Am. Inst. Min. Eng.*, xiv, 400.

1886. Remarks on the Clapp-Griffiths Process. *Id.*, xiv, 929, 934.

1888. Safety in House Drainage. *Pop. Sci. Mon.*, July, 1888.

**Hubbell, Henry W., Jr.**, Lieut. U. S. A. Prof. 1876–78.

1877. Report on Military Instruction. *M. I. T. Prest's Rep.*, 1877, 31.

**Hunt, Alfred E.**, S. B., III. (M. I. T.) 1876.

1878. (With Samuel Peters.) Determinations of Phosphorus in Irons as Phospho-Molybdate of Ammonia. *Metallurgical Review*, ii, July, 1878.

1883. About Some of the Properties of Steel. *Proc. Eng. Soc. of West. Penn.*, Dec. 18th, 1883.

1884. The Colorimetric Determination of Carbon in Steel. *Trans. Am. Inst. Min. Eng.*, xii, 303.

1884. Some Notes and Tests of an Open Hearth Steel Charge made for Boiler Plates. *Id.*, xii, 311.

1884. Report of Committee (as Secretary) on Natural Gas. *Eng. Soc. Western Penn.*, May, 1884.

1885. Pittsburgh Testing Laboratory Specifications for Materials and Workmanship of Structures of Iron and Steel. *Id.*, Dec. 15th, 1885. (With Joseph Ramsey, Jr.)

1886. Soft Steel for Boiler Plates. *Id.*, xiv, 826.

1886. Remarks on Methods for Estimation of Manganese and Phosphorus in Iron and Steel. *Id.*, xiv, 379.

1887. Requirements of Structural Steel. *Trans. Am. Soc. Civ. Eng.*

1887. The Estimation of Manganese in Iron and Steel by the Color-Method. *Trans. Am. Inst. Min. Eng.*, xv, 104.

1887. The Effect of Temperature upon Structural Iron and Steel. *Id.*, Oct. 18th, 1887.

1887. Some Recent Improvements in Open Hearth Steel Practice. *Id.*, xvi, 693.

1888. A Note Upon a Modification of the Refining Process Used by the Carbon Iron Company. *Id.*, xvii, 678.

1888. (With G. H. Clapp). The Impurities of Water. *Trans. Am. Inst. Min. Eng.*, xvii, 338.

1888. (With J. W. Langley and C. M. Hall). The Properties of Aluminum, with Some Information Relating to the Metal. *Id.*, xviii, 528.

1888. (With G. H. Clapp). The Impurities of Water. *Whipple's Water Supply*, 86.

1888. Basic Open Hearth Steel. *Eng. Soc. Western Pa.*, May and June, 1888, Meetings.

1889. Testing of Metal and Testing Machinery. *Eng. Soc. Western Pa.*, April 16th, 1889.

1889. Stone used for Structural Purposes in Allegheny County, Pennsylvania, Dec. 17.

1889. (With G. H. Clapp). The Impurities of Water. *Trans. Am. Inst. Min. Eng.*

1890. Aluminum. *Proc. Soc. Arts.*, 1890–91, 77.

1891. (With G. H. Clapp). The Inspection of Materials of Construction in the United States. *Id., Trans. Am. Inst. Min. Eng.*, xix, 911.

1891. The Properties, Uses and Processes of Production of Aluminum. *Tech. Quar.*, iv., 1.

1891. The Tests and Requirements of Structural Wrought Iron and Steel. *Trans. Am. Inst. Min. Eng.*, xx, 677.

1891. Prospects of the Use of Aluminum in Railroad Work. *Elec. Power*, iii, 174.

1892. Hydraulic Cements. *Eng. Soc. Western Pa.*

1892. (With G. H. Clapp and J. O. Handy). The Chemical Analysis of Aluminum. *Jour. Anal. Chem.*, vi, 24.

1892. Aluminum: its Manufacture and Uses from an Engineering Standpoint. *Jour. Frank. Inst.*, cxxxiii, 241.

1892. Aluminum. *Modern Mechanisms* and Appendix to *Appleton's Encyclopedia of Applied Mechanics.*

1893. Aluminum. [Lecture given before the Students of Troy Polytechnic Institute, Nov. 1892. *Polytechnic.*]

1893. A New Method of Testing Structural Steel. *Proc. Am. Soc. Civ. Eng.*, 1893. — World's Columbian Exposition Civil Engineering Congress.

1893. Retiring President's Address. *Eng. Soc. Western Pa.*, January, 1893.

1893. Aluminum. *U. S. Census Reports and of the U. S. Geological Survey Department of Mineral Statistics.* — Special Reports for World's Columbian Exposition.

**Hunt, T. Sterry**, LL.D. Prof. 1872–78. Died, 1892.

1872. The Goderich Salt Region in Canada. *Can. Naturalist*, vi, 70–79.

1872. On the Iron Sands of Canada. *Id.*, vi, 79–89.
1872. Geological History of the Mountain of Montarville. *Id.*, vi, 224–226.
1872. Osservationi intorno alla Geologia del Gruppo del Monte Bianco. *Boll. Com. Ital.*, iii, 131–140.
1872. The Palæogeography of the North American Continent. *Am. Geog. Soc. Jour.*, iv, 416–431.
1872. Malleable Iron. *Eng. and Min. Jour.*, 1872, 19.
1872. On Alpine Geology. *Am. Jour. Sci.* [**3**], iii, 1–15.
1872. Remarks on the late Criticisms of Prof. Dana. *Am. Jour. Sci.* [**3**], iv, 41–52.
1872. History of the Names Cambrian and Silurian in Geology. *Can. Naturalist*, vi, 281–311; 417–448.
1872. The Rigidity of the Earth and the Liquidity of Lavas. *Nature*, vi, 200.
1872. On Volcanic Phenomena. *Proc. Bost. Soc. Nat. Hist.*, xv. 250–252.
1872. On Concentric Lamination of Rocks. *Id.*, xv, 261.
1873. On some Points in Dynamical Geology. *Am. Jour. Sci.* [**3**], v, 264–270.
1873. On the Copper Deposits of the Blue Ridge. *Id.* [**3**], vi, 305–308.
1873. On the Geology of the White Mountains. *Proc. Bost. Soc. Nat. Hist.*, xv, 309.
1873. Eulogy on Dr. John Torrey. *Id.*, xv, 312–315.
1873. The Origin of Volcanic Products. *Nature*, viii, 66.
1873. On the Crystalline Rocks of the Blue Ridge. *Proc. Bost. Soc. Nat. Hist.*, xvi, 115.
1873. Notes on the Geology and Economic Mineralogy of the Southeastern Appalachians. Abstract. *Proc. Am. Assoc.*, xxii, Pt. II, 113.
1873. The Metamorphism of Rocks. Abstract. *Id.*, xxii, Pt. II, 115.
1873. Geology of Southern New Brunswick. Abstract. *Id.*, xxii, Pt. II, 116.
1873. Breaks in the American Palæozoic Series. Abstract. *Id.*, xxii, Pt. II, 117.
1873. The Geognostical History of the Metals. *Trans. Am. Inst. Min. Eng.*, i, 331–342.

1873. Remarks on an Occurrence of Tin Ore at Winslow. *Id.*, I, 373.

1873. The Origin of Metalliferous Deposits. *Id.*, i, 413–426.

1873. Supplementary Note on the Geology of the North Shore of Lake Superior. *Id.*, ii, 58, 59.

1873. The Ore-Knob Copper Mine and Some Related Deposits. *Id.*, ii, 123–129.

1873. Remarks on Prof. Newberry's Paper, "On Circles of Deposition," etc. *Proc. Am. Assoc.*, xxii, Part II, 196–198.

1873. The Chemical Composition of a Copper Matte. Abstract *Id.*, xxii, Pt. I, 143.

1874. Stratification of Rock Masses. *Proc. Bost. Soc. Nat. Hist.*, xvi, 237.

1874. The Deposition of Clays. *Id.*, xvi, 301.

1874. On Wet Processes of Copper Extraction. Abstract. *Proc. Am. Assoc.*, xxiii, Pt. II, 78.

1874. Chemical and Geological Essays. 8vo, pp. 473. Boston. [2d ed. Salem, 1878.]

1874. The Coals of the Hocking Valley, Ohio. *Trans. Am. Inst. Min. Eng.*, ii, 273–278.

1874. Coal and Iron of Southern Ohio. The Hocking Valley Coal Field and its Iron Ores. Pph. 8vo, pp. 78. Salem.

1874. A Century's Progress in Theoretical Chemistry. *Am. Chem.*, v, 56–61.

1874. Celestial Chemistry. *Pop. Sci. Monthly*, vii, 420.

1874. On Dr. Genth's Researches on Corundum and its Associated Minerals. *Proc. Bost. Soc. Nat. Hist.*, xvi, 332–335.

1874. On the Cement of some Natural and Artificial Stones. Abstract. *Proc. Am. Assoc.*, xxiii, Pt. I, 106.

1874. The Sewage Question Chemically Considered. Abstract. *Id.*, xxiii, Pt. I, 107–109.

1874. The Disintegration of Rocks and its Geological Significance. Abstract. *Proc. Am. Soc.*, xxiii, Pt. II, 38–41.

1875. Report on the Department of Geology. *M. I. T. Prest's Rep.*, 1875, 58–64.

1875. On the Boston Artesian Well and its Waters. *Proc. Bost. Soc. Nat. Hist.*, xvii, 486.

1875. Remarks on the Geology of Eastern Massachusetts. *Id.*, xvii, 508.

1875. Report on an Examination of the Hoosac Tunnel. *House Document* No. 9, 1875 (*General Court of Massachusetts*).

1875. On the Decayed Rocks of Hoosac Mountain. *Trans. Am. Inst. Min. Eng.*, iii, 187, 188.

1875. The Decayed Gneiss of Hoosac Mountain. *Proc. Bost. Soc. Nat. Hist.*, xviii, 106–108.

1875. Prof. J. D. Dana on the Alteration of Rocks. *Id.*, xviii, 108–112.

1876. Reports of the Councillors [of the Appalachian Mountain Club] for the Spring of 1876; Natural History. *Appalachia*, i, 35–38.

1876. On the History of the Crystalline Stratified Rocks. Abstract. *Proc. Am. Assoc.*, xxv, 205–208.

1876. The Geology of Eastern Pennsylvania. *Id.*, xxv, 208–212.

1876. The Quebec Group in Geology. *Proc. Bost. Soc. Nat. Hist.*, xix, 20.

1876. The Cornwall Iron Mine and some related Deposits in Pennsylvania. *Trans. Am. Inst. Min. Eng.*, iv, 319–325.

1876. A New Ore of Copper and its Metallurgy. *Id.*, iv, 325–328.

1876. Geology of the Eozoic Rocks of North America. *Proc. Bost. Soc. Nat. Hist.*, xix, 275–279.

1877. The Older Rocks of Western North America. Abstract. *Proc. Am. Assoc.*, xxvi, 265.

1877. Salt Region of Goderich, Canada. *Trans. Am. Inst. Min. Eng.*, v, 538–560.

1878. The Origin and Succession of the Crystalline Rocks. Abstract. *Nature*, xviii, 443–445.

1878. The Geological Relations of the Atmosphere. Abstract. *Id.*, xviii, 475.

1878. Special Report on the Trap-Dykes and Azoic Rocks of Southeastern Pennsylvania. Part I. Historical Introduction. 8vo, pp. 254.

**Hussey, Orin S.**, S. B. II. (M. I. T.) 1887.

1891. Electricity in Mill Work. Pph.

**Hyatt, Alpheus**, S. B., Prof. 1870–1887.

1870. Note on Rossia palpebrosa. *Peabody Acad. Rep.*, 1870, 79.

1870. On Morse's Classification of the Brachiopods. *Proc. Bost. Soc. Nat. Hist.*, xiii, 417.

1870. On Reversions among the Ammonites. *Id.*, xiv, 22–43.

1870. Embryology of Fossil Nautiloids. *Id.*, xiv, 58.

1870. Eozoön in Essex County. *Bull. Essex Inst.*, ii, 93.

1870. Upheaval and Subsidence of Continents. *Id.*, ii, 111.

1870. Report on the Cretaceous Fossils from Maroim, Province of Sergipe, Brazil, in the collection of Prof. Hartt. *C. F. Hartt's Geol. and Phys. Geog. of Brazil*, 385–393.

1870. Modern Ideas of Derivation. *Am. Nat.*, iv, 230–237.

1871. On Drift. *Proc. Bost. Soc. Nat. Hist.*, xiv, 91.

1871. On Changes of Coast Level. *Id.*, xiv, 122, 123.

1871. On the Relations of the Brachiopoda. *Id.*, xiv, 136, 137.

1871. On Natural Selection. *Id.*, xiv, 146–148.

1871. Catalogue of the Ornithological Collection of the Boston Society of Natural History: Part I., Spheniscidæ. *Id.*, xiv, 237–253.

1871. On the Embryology and Development of the Shells of the Ammonoids and Nautiloids. *Id.*, xiv, 396–399.

1871. On the Geological Survey of Essex County, Mass. *Bull. Essex Inst.*, iii, 49–53.

1871–72 and 1874–87. Annual Reports as Curator of the Boston Society of Natural History. *Proc. Bost. Soc. Nat. Hist.*, xiv–xxiii.

1872. The Non-Reversionary Series of the Liparoceratidæ and Remarks upon the Series of the allied Family Dactyloidæ. *Id.*, xv, 4–21.

1872. Fossil Cephalopods of the Museum of Comparative Zoölogy: Embryology. *Bull. Mus. Com. Zoöl.*, iii, 59–111. 4 plates.

1873. Evolution of the Arietidæ. *Proc. Bost. Soc. Nat. Hist.*, xvi, 166–170.

1874. Genetic Relations of the Angulatidæ. *Id.*, xvii, 15–23.

1874. Appendix to Communication on Reversion among Ammonites. *Id.*, xvii, 23–28.

1874. Letter on Planorbis and Valvata. *Rept. U. S. Geol. Surv.*, 1874, 403.

1874. Appendix to Communication on the Non-Reversionary Series of the Liparoceratidæ, etc. *Proc. Bost. Soc. Nat. Hist.*, xvii. 29–33.

1874. Note on Aptenodytes Patagonica. *Id.*, xvii, 94.

1874. Some Larval Forms of Ascidia. *Id.*, xvii, 130, 131.

1874. Hollow-fibred Horny Sponges. *Id.*, xvii, 204, 205.

1874. Remarks on two New Genera of Ammonites, Agassiceras and Oxynoticeras. *Id.*, xvii, 225–235.

1874. Abstract of a Memoir on the Biological Relations of the Jurassic Ammonites. *Id.*, xvii, 236–241.

1875. The Jurassic and Cretaceous Ammonites collected in South America by Prof. James Orton, with an appendix upon the Cretaceous Ammonites of Prof. Hartt's Collection. *Id.*, xvii, 365–372.

1875. Report on the Course in Palæontology. *M. I. T. Prest's Rep.*, 1875, 54–57.

1875–77. Revision of the North American Poriferæ. *Mem. Bost. Soc. Nat. Hist.*, ii, 399–408; 481–554.

1876. Remarks on the Porphyries of Marblehead. *Proc. Bost. Soc. Nat. Hist.*, xviii, 220–224.

1876. Genetic Relations of Stephanoceras. *Id.*, xviii, 360–400.

1876. Review of Mojsisovics' "Das Gebirge um Hallstadt." *Am. Jour. Sci.* [**3**], xi, 412.

1876. The Embryology of Sponges. *Proc. Bost. Soc. Nat. Hist.*, xix, 12–17.

1877. Resolutions on the Death of F. B. Meek. *Id.*, xix, 76, 77.

1877. Sponges. *Johnson's Encyclopedia*, iv, 1667, 1670.

1878. Ammonitoid Forms of the Upper Trias of Nevada. *U. S. Geol. Expl. 40th parallel*, iv, 105.

1878. On a new Species of Sponge. *Proc. Acad. Nat. Sci. Phil.*, 1878, 63, 64. 1 plate.

1878. Laws of Heredity. *Science News*, i, 37, 38.

1879. Notes on Meekoceras Hyatt. *Bull. U. S. Geol. Surv.*, v, 111, 112.

1879–81. Guides for Science Teaching. (Boston Society of Natural History.) Pph. 16mo. Boston, 1879–81.

I. About Pebbles.

III. Commercial and other Sponges.

V. Common Hydroids, Corals, and Echinoderms.

VI. Mollusca.

VII. Worms and Crustacea.

1880. Genesis of the Tertiary Species of Planorbis at Steinheim. *Anniv. Mem. Bost. Soc. Nat. Hist.*, pp. 129. 9 plates.

1880. Transformations of Planorbis at Steinheim. Abstract. *Proc. Am. Assoc.*, xxix, 527–550.

1880. General Guide to the Museum of the Boston Society of Natural History. Part I. Introduction. Pph. 12mo, pp. 26, with plan of the building. Boston, April, 1880. 2d ed., Aug., 1880, without plan.

1880. Change in the Shell of Limnæa megasoma produced by Confinement. *Am. Nat.*, xiv, 51, 52.

1880. Moulting of the Lobster, Homarus Americanus. *Proc. Bost. Soc. Nat. Hist.*, xxi, 83, 90.

1880. Transformations of Planorbis. *Science*, i, 138.

1880. Heredity. *Sketches, . . . Radical Club*, 316–321; 323–326.

1880. Evolution. *Id.*, 329–331.

1880. On Prof. Peirce's Essay on Idealism. *Id.*, 341, 342.

1882. Remarks on Distortions of Lobster's Claws. *Proc. Bost. Soc. Nat. Hist.*, xxi, 278.

1882. Transformation of Planorbis at Steinheim, with remarks on the effects of gravity upon the forms of Shells and Animals. *Am. Naturalist*, 441–453. 2 plates.

1883. Genera of Fossil Cephalopods. *Proc. Bost. Soc. Nat. Hist.*, xxii, 253–338.

1883. Fossil Cephalopoda in the Museum of Comp. Zoölogy. *Proc. Am. Assoc.*, xxxii, 323–361.

1883. (With S. F. Clarke.) Society of Naturalists of the Eastern United States. *Science*, i, 411, 412.

1883. Boston Society of Natural History's Collection of Minerals. *Id.*, i, 436, 437.

1883. Joachim Barrande: His Life and Works. *Id.*, ii, 699–701, 727–729.

1883. Genus Meekoceras, with Remarks on Species. *Rept. U. S. Geol. and Geog. Survey of Territories*, 1878. Part I. (Hayden). 112–117.

1884. The Business of the Naturalist. *Science*, iii, 44–46.

1884. The Evolution of the Cephalopoda. *Id.*, iii, 122–127, 145–149.

1884. Larval Theory of the Origin of Cellular Tissue. *Id.*, iii, 337.

1884. The Larval Theory of the Origin of Cellular Tissue. *Am. Naturalist*, xviii, 460–464.

1884. The Protoconch of Cephalopoda. *Id.*, xviii, 919, 920.

1884. The Primitive Conocoryphean. *Science*, iv, 351.

1884. The Agassiz Association. *Id.*, iv, 487, 488.

1884. Objections to some commonly accepted views of Heredity. *N. Y. Med. Jour.*, 1884, 324.

1884–5. Larval Theory of the Origin of Cellular Tissue. *Proc. Bost. Soc. Nat. Hist.*, xxiii, 45–163.

1885. Structure of the Siphon in the Endoceratidæ. Abstract. *Proc. Am. Assoc.*, xxxiii, 490.

1885. Larval Theory of the Origin of Tissue. Abstract. *Id.*, xxxiii, 491.

1885. Structure and Affinities of Beatricea. Abstract. *Id.*, xxxiii, 492.

1885. Objections to some commonly accepted Views of Heredity. Abstract. *Id.*, xxxiii, 509.

1885. Notes on Tentaculites. *Bull. Nat. Hist. Soc., New Bruns.*, iv, 102.

1885. Cruise of the Arethusa. *Science*, vi, 384.

1886. Larval Theory of the Origin of Tissue. *Am. Jour. Sci.* [3], xxxi, 332–347.

1886. On a supposed Fossil from Lake Superior. *Proc. Bost. Soc. Nat. Hist.*, xxiii, 210, 211.

1887. Primitive forms of Cephalopods. *Am. Nat.*, xxi, 64–66.

**Ingalls, Walter R.**, S. B., III. (M. I. T.) 1886.

1892. The following articles in Appleton's Cyclopedia of Mechanics, 1892. "Coal Breakers"; "Coke Ovens"; "Ore Crushing Machinery"; "Ore Dressing Machinery"; "Ore Sampling Machinery"; "Gold Mills"; "Silver Mills"; "Roasting Furnaces"; and "Smelting Furnaces."

1891–2. Numerous articles in *Eng. Min. Jour.*, v, l, li, lii. 1891 and 1892.

1893. Nickel and Cobalt; Chronology of Gold and Silver Mining. *Mineral Industry.* New York, 1893.

**Jacques, William W.**, S. B., VIII. (M. I. T.) 1876. Ph. D. (J. H. U.) 1879; Instr. 1883–91.

1875. Light Transmitted by one or more Plates of Glass. *Proc. Am. Acad.*, x, 389–391.

1876. Answer to M. Jamin's Objections to Ampère's Theory. *Id.*, x, 445–450.

1876. An Experimental Proof of the Law of Inverse Squares for Sound. *Id.*, xi, 265–268.

1876. Diffraction of Sound. *Id.*, xi, 269–272.

1876. New Experiments on Sound. [Graduating Thesis.] Abstract in *M. I. T. Prest's Rep.*, 1876, 16, 17, 115–118.

1876. Universities and Polytechnic Schools of German-speaking Europe. *Record and Directory of Class of '76.*

1878. Effect of the Motion of the Air within an Auditorium upon its Acoustic Qualities. *Jour. Frank. Inst.* [3], lxxvi, 390–395.

1879. On the Velocity of Very Loud Sounds. *Am. Jour. Sci.* [3], xvii, 116–119.

1879. Diamagnetic Constants of Bismuth and Calc-Spar in Absolute Measure. *Id.*, xviii, 368–371.

1879. Distribution of Heat in the Spectra of various Sources of Radiation. *Proc. Am. Acad.*, xiv, 142–163.

1882. Acoustic Architecture. *Pop. Sci. Mon.*, xxi, 454–462.

1884. Underground Wires. *Id.*, xxiv, 503–509.

1885. Underground Wires. *Science*, vi, 6, 7.

1885. Underground Telegraph Wires. *Proc. Soc. Arts, M. I. T.*, 1884–85, 21–27.

1886. Recent Progress in Underground Wires. *Id.*, 1885–86, 20.

1887. An Empirical Rule for Constructing Telephone Circuits. *Proc. Amer. Acad.*, xv, 125.

1890. Telephonic Specific Inductive Capacity. *Elec. Eng.*, x, 363.

1892. What Electricity is: illustrated by Some Newer Experiments. *Proc. Am. Acad.*, xxvii, 19.

**Jameson, C. D.**, S. B. Instr. 1886–87.

1886. Notes on the Panama Canal. *Jour. Ass. Eng. Soc.*, Aug., 1886.

1887. Railroad Engineering Education. *Proc. Soc. Arts, M. I. T.*, 1886–87, 20.

**Jordan, Edwin O.**, S. B., VII. (M. I. T.) 1888, Ph. D.

1889. The numbers of Bacteria in Certain City Tap-Waters. *Tech. Quar.*, ii, p. 322.

1890. Phagocytoces and Immunity. *Boston Medical and Surgical Journal*, cxxii.

1890. Recent Theories on the Function of the White Blood-Cells. *Tech. Quar.*, iii.

1890. Certain Species of Bacteria Observed in Sewage. *Mass. State Board of Health Report*, Vol. on *Water Supply and Sewage.*

1890. [With Mrs. E. H. Richards.] Investigations on Nitrification and the Nitrifying Organism. *Mass. State Board of Health Report*, Vol. on *Water Supply and Sewage.*

1891. The Spermatophores of Diemyctylus. *Journal of Morphology*, v.

1892. The Cleavage of the Amphibian Ovum. (With A. C. Eycleshymer.) *Anatomischer Anzeiger*, vii.

1893. The Habits and Development of the Newt (Diemyctylus viridescens). *Journal of Morphology*, viii.

**Kastner, Charles.** Lowell Instructor in Design, 1872—.

1873–77. Reports on the Lowell Course of Design. *M. I. T. Prest's Rep.*, 1873, 66; 1874, 14; 1875, 34; 1876, 166; 1877, 92.

1880. Industrial Art as applied to Manufactures. *Proc. Soc. Arts, M. I. T.*, 1879–80, 67.

1881. Industrial Art as applied to Manufactures. *Id.*, 1880–81. 103.

1892. The Lowell School of Design. *Wade's Fibre and Fabric*, xv, 85.

**Kean, Alex. L.**, Stud., 1884–88.

1888. (With E. O. Jordan.) A Glass of Water. *Tech. Quar.*, ii, 229.

1890. The Lily Disease in Bermuda. *Tech. Quar.*, iii, 253.

**Kendall, Charles B.**, S. B., V. (M. I. T.) 1887. Asst. 1887–88.

1887. (With L. M. Norton.) Preparation of Alizarine Assistant and its Action in Turkey-Red Dyeing. *Textile Record*, 1887, 227.

1887. Preparation and Action of Alizarine Assistant. *Tech. Quar.*, i, 345.

**Kilham, Alfred C.**, S. B., II. (M. I. T.) 1876.

1876. On Pumping Engines. [Graduating Thesis.] Abstract in *M. I. T. Prest's Rep.*, 1876, 90, 91.

1876. Davy's Differential Valve Gearing. *Jour. Frank. Inst.* [3], lxii, 121.

**Kimball, Fred. M.**, Stud. 1881–83.

1888. The Dynamo. How it is Made and How to Use It. pp. 79. Boston, 1888. Illustrated.

**Kneeland, Samuel**, A. M., M. D. Instr. 1867–69; Prof. 1869–78; Sec'y of Corporation 1866–78; Sec'y of Faculty 1871–78.

1866–68. Annual of Scientific Discovery. 2 vols., 12mo. Boston, 1868, 1869.

1867. On a Fungoid Parasite or Caterpillar Fungus from the Philippine Islands. *Proc. Bost. Soc. Nat. Hist.*, xi, 120–124.

1867. On the Relation of the Plumage of Birds to their Nidification. *Id.*, xi, 320.

1870. Annual of Scientific Discovery. See Trowbridge, John.

1871. Report as Secretary of the Institute. Pph. 8vo, pp. 16. No title.

1871. Observations made on a Voyage from Panama to California. *Proc. Bost. Soc. Nat. Hist.*, xiv, 137.

1871. On the Sand Blast. *Id.*, xiv, 149.

1871. The Wonders of the Yosemite Valley and of California. Illustrated. 8vo. Boston.

1872–77. Reports as Secretary in *M. I. T. Prest's Rep.*, 1872, 9–16; 1873, 1–5; 1874, xxiii-xxxii; 1875, xvii-xxxi; 1876, 1–25; 1877, 1–29.

1872. On the Glaciers of the Yosemite Valley. *Proc. Bost. Soc. Nat. Hist.*, xv, 36–47.

1872. On the Volcanoes of the Sandwich Islands. *Id.*, xv, 249.

1874. Remarks on the Ashantees and Fantees. *Id.*, xvi, 335.

1874. Evidence for and against the Existence of the so-called Sea Serpent. *Id.*, xvi, 337.

1875. Report on the Instruction in Physiology, etc. *M. I. T. Prest's Rep.*, 1875, 49.

1876. An American in Iceland: Millennial Celebration in 1874; Notes on the Orkney, Shetland, and Faroë Islands, etc. 12mo, pp. 326, with map and illustrations. Boston.

Also, numerous contributions to the new edition of Appleton's Cyclopædia.

**Lane, Frederick H.**, S. B., II. (M. I. T.) 1879.

1884. Lane's Universal Yarn Tables. Chart. Boston, 1884.

1881–5. Various communications to the *Textile Record.*

**Lanza, Gaetano**, S. B., C. E. Instr. 1871–72; Asst. Prof. 1872–75; Prof. 1875—.

1874. Report of Instruction in Mechanics and Mechanical Engineering. *M. I. T. Prest's Rep.*, 1874, 46–50.

1875. Report on Instruction in Theoretical and Applied Mechanics. *M. I. T. Prest's Rep.*, 1875, 72–75.

1879. An Ascent of Mt. Kinsman. *Appalachia*, ii, 168–170.

1880. Remarks on Space of n Dimensions. In *Mrs. J. T. Sargent's Sketches and Reminiscences of the Radical Club.*

1881. A Sojourn in Andover, Maine. *Appalachia*, ii, 246–255.

1881. The Strength of Wooden Columns: Account of Tests made on the Government Testing Machine. *Boston Jour. of Commerce*, Jan. 1, 1881.

1882. Report of certain Tests on full sized Wooden Mill Columns made for the Boston Manufacturers' Mutual Fire Insurance Company. Reprinted from *Boston Jour. of Commerce.* Pph. 8vo, pp. 50. Boston.

1882. Transverse Strength of large Spruce Beams. Reprinted from *Boston Jour. of Commerce*, June 24, 1882. Pph. 8vo, pp. 8. Boston.

1883. An Account of certain Tests of the Transverse Strength and Stiffness of Large Spruce Beams. *Jour. Frank. Inst.*, Feb., 1883. Also *Trans. Am. Mech. Eng.*, iv, p. 119.

1883. The Transverse Strength of Wooden Beams. *Jour. Asso. Eng. Soc.*, ii, 133–136.

1883. Transverse Strength of Timber. A series of articles in *Am. Architect*, beginning Nov., 1883.

1885. Applied Mechanics and Resistance of Materials. 8vo, pp. 700. New York. 6th ed. revised 1882, pp. 929.

1886. The Course in Mechanical Engineering at the Mass. Institute of Technology. *Trans. Am. Soc. Mech. Eng.*, vii, pp. 9.

1886. Transmission of Power by Belting. *Id.*, vii, pp. 11.

1886. Transmission of Power by Belting. *Proc. Soc. Arts, M. I. T.*, 1885–86, 59.

1886. Transmission of Power by Belting. *Proc. of N. E. Cotton Manufacturers' Asso.*, Twenty-first Meeting.

1886. Notes on Mechanical Engineering. Mass. Institute of Technology. Pph. 8vo, Pt. I., pp. 43; Pt. II., The Injector, pp. 30; Pt. III., Steam Pumps, pp. 20. Boston, 1885–86.

1887. Strength of Shafting subjected to both Twisting and Bending. *Trans. Am. Soc. Mech. Eng.*, viii, 130.

1887. Discussion on the Teaching of Mechanical Engineering. *Id.*, viii, 331.

1887. Notes on Friction. Mass. Institute of Technology. Pph. 8vo, pp. 139.

1887. Notes on the Engineering Laboratories of the Mass. Institute of Technology. *Proc. British Inst. C. E.*

1887. Discussion on Reciprocating Parts of High-Speed Engine. *Trans. Am. Soc. Mech. Eng.*, viii, 203.

1888. Friction of Toothed Gearing. *Trans. Am. Soc. Mech. Eng.*, ix, 185. Also *Tech. Quar.*, i, 153.

1888. Strength of Cast Iron. Tests made in the Laboratory of Mass. Institute of Technology. *Tech. Quar.*, ii, 143. Also *Trans. Am. Soc. Mech. Eng.*, x, 187.

1888. (With J. Sondericker.) An Investigation as to How to Test Cements. *Trans. Am. Soc. Mech. Eng.*, ix, 172.

1888. Report in Relation to Heating Passenger Cars by Steam from the Locomotive. (To the Mass. R. R. Commissioners.) Pph. 8vo, pp. 27. Boston, March, 1888.

1888. Notes on the Engineering Laboratories of the Mass. Institute of Technology. *Tech. Quar.*, i, 356.

1888. Heating Passenger Cars by Steam from the Locomotive. *Proc. Soc. Arts., M. I. T.*, 1888–1889, xiii. Also *Tech. Quar.*, ii, 38.

1888. Notes on the Engineering Laboratories of the Mass. Institute of Technology. *Proc. Inst. of Civ. Eng.*, xci.

1888. Account of Certain Experiments upon Several Methods of Counterbalancing the Action of the Reciprocating Parts of a Locomotive. *Tech. Quar.*, ii, 235. Also *Trans. Am. Soc. Mech-Eng.*, x, 302.

1889. Applied Mechanics. 8vo, pp. 729. New York, 1889.

1890. The Engineering Laboratories. *Tech. Quar.*, iii, 144.

1890. (With G. F. Swain, S. H. Woodbridge and F. W. Chandler.) The Engineering Building. *Proc. Soc. Arts.*, 1888-89, 121.

1890. Notes on the Action of the Reciprocating Parts of a Steam Engine. Pph. 8vo, pp. 43. Boston.

1891. Notes on Friction. Pph. 8vo, pp. 139.

1891. Applied Mechanics. 8vo, pp. 929. New York. (Revised edition.)

1892. Notes on Dynamometers, Planimeters, Governors, and Fly-Wheels. 8vo, pp. 107. (Revised edition.) Boston.

1892. Details of an Eight-Wheel Locomotive. Pph. Text, 8vo, pp. 33. Plates, 4to, pp. 22. Boston.

**Lawton, Wm. H., Jr.**, S. B., I. (M. I. T.), 1877.

1887. Annual Report of Street Commissioner City of Newport.

**Lee, C. Tennant**, Stud., 1865–67.

1884. Valuation of Indigo. *Jour. Am. Chem. Soc.*, 6, 185.

**Leonard, H. Ward**, S. B., III. (M. I. T.), 1883.

1886. On the Size of Conductors for Incandescent Lighting when Lamps are in Multiple Arc. *Electrician* and *Elec. Eng.*, Aug., 1886.

1888. The Distribution of Copper for Highest Economy in the Two and Three Wire Systems. *Trans. Assoc. of Edison Illuminating Co.*, Aug., 1888.

1888. The Comparative Value of the Continuous and Alternating Systems for the Commercial Distribution of Electricity. *Elec. Eng.*, vii, 166.

1891. The Highest Economy in the Use of Incandescent Lamps. *Elec. Eng.*, xi, 448, and *Elec. World*, xvii, 288.

1891. The Electrical Transmission and Conversion of Energy

for Mining Operations. *Elec. Eng.*, xi, 552, also *Trans. of Assoc. Mining Engineers, P. Q.*

1891. Minimum First Cost of Plant and Maximum Economy of Operation in the Elec. Transmission of Power. *Id.*, xii, 249, 344.

1891. A Solution of Block Signal Problem. *Eng. Mag.*, ii, 82.

1891. A Motor Operating Automatically at any Desired Speed or Torque and with Minimum Efficiency under all Conditions. *Elec. World*, xviii, 400.

1892. A Central Station Combining the Advantages of Both the Continuous and Alternating Current Systems. *Elec. Eng.*, xii, 299.

1892. The Transmission of Electric Energy by Alternating Current and its Utilization by Continuous Currents. *Id.*, xiii, 215.

1892. A New Three-Wire System. *Id.*, xiii, 572, 633, xiv, 65.

1892. A New System of Electric Propulsion. *Id.*, xiii, 607. Also *Trans. Am. Inst. Elec. Eng.*, ix, 566.

1892. The Uses of Electricity in a Modern Residence. *Elec. World*, xix, 71.

**Levermore, Chas. H.**, A. B. (Yale), Ph. D. Asst. Prof. 1888–9; Asso. Prof. 1889–92; Prof. 1892—.

1885. Witchcraft in Connecticut. *New Englander* and *Yale Review*, 1885.

1886. New Education Run Mad. *Education.* Boston, 1886.

1886. The Republic of New Haven. Cloth, 8vo, pp. 342. Balto.

1888. (With D. R. Dewey.) Political History since 1815. Cloth, 8vo, pp. 73. 2d ed., 1889, pp. 116; 3d ed., 1892, pp. 142. Boston.

1889. Pilgrim and Knickerbocker in Conn. Valley. *New Eng. Mag.*, i, 173.

1889. Endowed Newspapers. *Andover Review*, Nov., 1889.

1889. Two Centuries and a Half in Guilford, Conn. *New Eng. Mag.*, i, 405.

1890. Impressions of a Yankee Visitor in the South. *New Eng. Mag.*, ii, 311.

1891. Henry C. Carey. *Pol. Sci. Quar.*, v, 553.

1892. Methods and Results of Instruction in History. *School and College.*

1892. Syllabus for the Study of U. S. History. 8vo, pp. 86. Boston, 1892.

**Levi, Louis E.**, Ph. D. Asst. 1888–90.

1890. Biophene. *Tech. Quar.*, iii, 162.

**Lewis, Wilfred**, S. B., II. (M. I. T.) 1875.

1875. On Governors. [Graduating Thesis.] Abstract in *M. I. T. Prest's Rep.*, 1875, 118, 119.

1880. On the Angular Pitch of Square-threaded Screws. *Proc. Engineers' Club of Phila.*, i, 243–251.

1880. Review of the Report on the Irwin Injector. *Jour. Frank. Inst.*, June, 1880.

1882. Speeding Engine Lathes. *Mechanics*, i, No. 16.

1882. Application of Logarithms to Problems in Gearing. *Proc. Eng. Club of Phila.*, iii, No. 2.

1883. Comparative Strength of Spur and Bevel Gears. *Mechanics*, iv, No. 90.

1884. Resilience of Steel. *Proc. Eng. Club of Phila.*, iv, ch. 4.

1886. Experiments on the Transmission of Power by Gearing. *Trans. Am. Soc. Mech. Eng.*, vii, 273.

1886. Experiments on the Transmission of Power by Belting. *Id.*, vii, 549.

1886. Loads on Tires. *Id.*, vii, 634.

1886. Valve Dynamometers. *Id.*, vii, 643.

1886. Discussion on Prof. Alden's paper on Formulæ and Tables for Calculating the Effect of the Reciprocating Parts of High-Speed Engines. *Id.*, viii, 214.

1886. Discussion on Prof. Reuleaux's paper, Friction of Toothed Gearing. *Id.*, viii, 67.

Also U. S. Patents, 352,623, and 354,033 for 1886.

1887. Discussion on Prof. Lanza's paper, Friction in Toothed Gearing. *Id.*, ix, 217.

1890. A Hammer Blow. *American Machinist*, June 12.

1890. Regarding Gear Teeth. *Id.*, June 26 and July 31.

1890. Discussion on Mr. McBride's paper, Some Experiments with a Screw-bolt. *Trans. Am. Soc. Mech. Eng.*, xii, 784.

1890. Bearing Surface in Proportion to Wear. *Am. Machinist*, July 24.

1891. A New Feed Ratchet, A New Shaft Coupling. *Proc. Eng. Club of Phila.*, viii.

1892. Annual Address as *Pres't. Eng. Club of Phila. Id.*, ix, 97.

1893. Investigation of the Strength of Spur Gearing. *Id.*, x, No. 1.

**Lindsay, Wm. B.**, S. B., V. (M. I. T.) 1881. Asst. 1881–82, also 1884–5.

1892. Manual of Qualitative Chemical Analysis of Eliot and Storer as revised by W. R. Nichols. Newly revised. Cloth, 12mo, pp. 204. New York, 1892.

**Little, Arthur**, Stud. 1870–75.

1887. Early New England Interiors. Boston, 1887.

**Little, Arthur D.**, Stud., 1881–84.

1893. (With Roger B. Griffin.) The Chemistry of Paper Making. 8vo, pp. 550. New York, 1893.

**Livermore, William D.**, S. B., V. (M. I. T.) 1887.

1887. (With L. M. Norton.) Ueber die Einwirkung von verdünnter Salpetersäure auf Substituirte Amidoverbindungen. *Ber. d. chem. Ges.*, 20, 2268.

**Lodge, Richard W.**, Stud. 1876–79; Asst. 1886–87; Instr. 1890.

1887. (With R. H. Richards.) The Descent of the Charge in a Blast Furnance. *Trans. Am. Inst. Min. Eng.*, July, 1887. Also *Tech. Quar.*, i, 140.

**Low, Wilson H.**, S. B. (M. I. T.) 1886.

1892. A New Method for the Determination of Soda in Soap, with a few notes on methods generally employed. *Jour. of Anal. and Applied Chem.*, Aug. Easton, Penn.

1893. A New Form of Extraction Apparatus for Use in the Analysis of Fats, Oils and Soaps. *Am. Soap Jour. and Perf. Gaz.*, May.

**Luquiens, Jules**, Ph. D. Instr. 1874–80; Asst. Prof. 1880–84; Assoc. Prof. 1884–92.

1877. Outlines of French Grammar. Pph. 12mo, pp. 38. Boston.

1878. On some of the Religious Notions of the Gâthâs. Abstract. *Jour.* (*and Proc.*) *Am. Oriental Soc.*, May, 1878.

1880. Remarks on the Methods and Processes of Comparative Mythology. *Id.*, May, 1880.

1880. On a certain Phonetic Change in Zend. *Id.*, May, 1880.

1880. The Avesta and Storm Myth. Ormazd et Ahriman, leurs Origines, etc., par James Darmesteter. Review. *New Englander*, 1880, 635–652.

1881. The Vendidâd as translated by M. Darmesteter. Review. *Am. Jour. of Philology*, 1881.

1885. French Prose of Popular Science and Descriptive Literature. 8vo, pp. 419. Boston. Revised ed., pp. 138. Boston, 1892.

1887. A Second Year's Course in French Grammar. Pp. 93. Boston. Revised ed., pp. 138. Boston, 1892.

**Lyle, David A.**, Capt. Ord. Dept. U. S. A., S. B., III. (M. I. T.). 1884.

1871. (With Lieuts. Wheeler and Lockwood, and Profs. E. P. Austen and G. K. Gilbert.) Preliminary Report Concerning Explorations in Nevada and Arizona. 4to. Appendix. B, 76.

1874. Clayton Valley, Nevada. *Eng. Min. Jour.*, xvii, 98, 122, 139.

1876. Manufacture of Leather on the Pacific Coast. *Ordnance Notes*, No. 52.

1877. Cremation among the Sitka Indians. *Am. Nat.*, xi, 372.

1877. Designs for 2″, 2.5″ and 3″ Bronze Life-Saving Guns and Projectiles.

1877. The Benton Dynamometer. *Ordnance Notes*, No. 66.

1877. Cutters and Pistons for Pressure Gauges. *Id.*

1877. Notes on the Breeding Habits of the Golden-Winged Woodpecker. *Am. Nat.*, xi, 742.

1877. Notes on Leather. *Ordnance Notes*, No. 72.

1878. The Springs of Southern Nevada. *Am. Nat.*, xii, 18.

1878. (With C. E. Emery.) Design for the Lyle-Emery Grapple Shot for Life-Saving Purposes. *Ordnance Notes*, No. 108.

1878. Life-Saving Apparatus. *Ordnance Notes*, No. 83.

1878. (With others.) Fabrication of Small Arms. *Ordnance Memoranda*, No. 22. 4to.

1878. The Robin's Food. *Am. Nat.*, xii, 448–453.

1878. Report on Life-Saving Apparatus. 8vo, pp. 158. Plates 54. Separate editions were printed by the Ordnance Department and the Life-Saving Bureau.

1879. Report on the Lyle-Emery Grapple Shot. *Ordnance Notes*, No. 108.

1879. (With others.) Report on Indian Arms. *Ord. Notes*, No. 115, and *Rept. Chief of Ordnance*, 1879.

1880. Description of a New Method of Fastening Faking Boxes. *Rept. Chief of Ordnance.* App. 15 (321).

1880. Descriptive Report on Two Galvanized Sheet-Iron Faking Boxes designed for the Life-Saving Service. *Id.* App. 16 (325).

1880. Report on Foreign Life-Saving Rockets and Rocket Apparatus. 8vo, pp. 49. Plates 19.

1880. (With Capt. John C. Patterson.) Report on Trials with the Lyle-Emery Grapple Shot. *Annual Rept. U. S. Life-Saving Service*, 308.

1881. Wreck Artillery, Article on, in *Hamersly's Naval Encyclopedia*, 851.

1881. Report on Spencer Line-Throwing Gun for Life-Saving Purposes. *Rept. Chief of Ordnance.* App. 21 (185).

1881. Report on the Hunt Life-Saving Projectile. *Id.*, App. 25 (253).

1881. (With Lieut. T. D. Walker and Keeper J. C. Patterson, as a Committee of Board on Wreck Ordnance.) Report on Trials with the Spencer Line-Throwing Gun. *Annual Rept. of the U. S. Life-Saving Service*, 388.

1881. Report on Sponge, Sponge Cover, and Cartridge Bag for Life-Saving Purposes. *Ord. Notes*, No. 159.

1881. (With others as Members of "Board on Wreck Ordnance.") Report on Trials, etc., of the Hunt Life-Saving Projectile. *Annual Rept. U. S. Life-Saving Service*, 339.

1881. Report on Powder and Cartridge Bags for the U. S. Life-Saving Service. *Id.*, 403.

1881. Report on Firing-Record Books. *Id.*, 411.

1881. (With S. W. Porter, Master Armorer, National Armory.) Manufacture and Uses of Files and Rasps. 8vo, pp. 60. Plates

1881. The Manufacture of Russet Leather, and its Adaptability for the Military Service. *Ord. Notes*, No. 172 (Dec. 9, 1881).

1882. Vent Punch and Vent Gimlet for the Life-Saving Service. *Ord. Notes*, No. 176 (Feb. 21, 1882).

1882. Report on Cranston's Safety-Lighting Attachment (for Lanterns). *Ord. Notes*, No. 201 (June 12, 1882).

1882. (With Capt. J. C. Patterson.) German Life-Saving Rockets and Rocket Apparatus. *Annual Rept. U. S. Life-Saving Service*, p. 431.

1882. (With same.) Trials with Cranston's Safety-Lighting Attachment for Lanterns. *Id.*, 451.

1882. (With same.) Jackson's "Improved Self-Igniting Fusee Signals." *Id.*, 455.

1882. (With same.) Holmes's Marine Signals. *Id.*, 461.

1882. Rockets, their Classification, History and Manufacture. *Id.*, 437.

1882. (With Supt. D. P. Diffins and Keeper J. C. Patterson.) Coston's Beach Light and Holder. *Id.*, 458.

1882. (With same.) Jones's Hand Cart. *Id.*, 464.

1883. (With Lieuts. C. W. Whipple and H. D. Borup, Ord. Dept. U. S. A.) Report on the Fabrication of 8-inch Projectiles. *Rept. Chief of Ordnance.* App. 23 (217).

1883. Locusts as Food for Man. *Pop. Sci. Monthly*, xxiii, 531–535.

1883–84. (With others as Members of "Board on Life-Saving Appliances.") Report on Life-Saving Appliances. *Annual Rept. of U. S. Life-Saving Service*, 1883, pp. 405 *et seq.*; 1884, 427.

1884. (With Supt. B. C. Sparrow and Keeper J. C. Patterson.) Report on the Ottinger Sand Wheel. *Id.*, 449.

1884. Construction Report of the 6½-inch Mann Breech-Loading Rifle. *Rept. Chief of Ordnance.* App. 25 (306).

1884. Report on Physical Properties of Materials for Gun Construction at the South Boston Iron Works. *Id.* App. 31 (481).

1884. (With others as Members of "Board for Testing Rifled Cannon.") 1. Trial of 8-inch Muzzle-Loading Rifle, lined with a Steel Tube, converted from a 10″ Rodman S. B. Gun. *Rept. Chief of Ordnance.* App. 21 (244). 2. Progress Report of Trial of 3.2″ Breech-Loading Steel Rifle. *Id.* App. 22 (277).

3. Trial of H. F. Mann's 6½-inch Breech-Loading Rifled Cannon. *Id.* App. 23 (293).

1884. The Rise, Progress, and Methods of the U. S. Life-Saving Service. *Proc. Soc. Arts, M. I. T.*, 1883–84, 56–72.

1885. Casting Heavy Guns at South Boston. *Id.*, 1884–85, '88–89.

1885. Construction Report of the Cast Iron Body for the 10-inch Wire-Wrapped B. L. Rifle. *Rept. Chief of Ordnance*, 1885. App. 23 (159).

1885. Construction Report of the 12-inch Cast Iron Breech-Loading Rifle Fabricated by the South Boston Iron Works, during the Years 1883–1885. *Id.* App. 24 (165).

1885. Report on Experimental Cylinder from the 12-inch Cast Iron Breech-Loading Rifle Hooped and Tubed with Steel. *Id.* App. 28 (271).

1885. Annual Report of Inspector of Ordnance at South Boston Iron Works. *Id.* App. 32 (331).

1885. Report on the Manufacture of 8-inch Chilled Projectiles. *Id.* App. 38 (403).

1885. (With Lieut. H. D. Borup, U. S. A.) Construction Report of the 12-inch Cast Iron Rifled Mortar Hooped with Steel. *Id.* App. 25 (175).

1885. (With same.) Experimental Cylinder from the 12-inch Cast Iron Rifled Mortar Hooped with Steel. *Id.* App. 26 (209).

1885. (With others as Members of a "Board for Testing Rifled Cannon.") 1. Progress Report on the 8-inch Yates Breech-Loading Rifle. *Id.* App. 48 (483). 2. Trial of the 3.2-inch Breech-Loading Steel Rifle. *Id.* App. 49 (492).

1886. Construction Report of 8-inch Yates B. L. Rifle, Converted. *Rept. Chief of Ordnance.* App. 19 (275).

1886. Annual Report of the Inspector of Ordnance at South Boston Iron Works. *Id.* App. 22 (309).

1886. (With others as Members of "Board for Testing Rifled Cannon.") 1. Report on the 8-inch Yates Breech-Loading Rifle. *Id.* App. 9 (82). 2. Progress Report on Trial of 12-inch B. L. Cast Iron Rifle. *Id.* App. 10 (113). 3. Progress Report on Trial 12-inch M. L. Rifled Mortar Hooped with Steel. *Id.* App. 11 (139).

1886. (With others as Members of "Board on Life-Saving Appliances.") Report on Life-Saving Appliances. *Annual Rept. U. S. Life-Saving Service*, 475.

1886. (With Captains F. R. Baby and J. H. Merryman and Supt. B. C. Sparrow.) Report on Haskin's Self-Propelling Life Raft. *Id.*, 505.

1886. (With Capt. J. H. Merryman and Keeper J. C. Patterson.) Report on Pain's Night Signal, *Id.*, 512.

1886. (With Capt. J. H. Merryman and Supt. B. C. Sparrow.) Report on Davis's Standard Row Locks. *Id.*, 514.

1886. (With Capt. J. H. Merryman and Asst. Supt. Jno. Waters.) Report on Detwiller's Signal Rocket and Signal Shell. *Id.*, 516.

1886. (With Capt. J. H. Merryman.) Report on McLellan's Proposed Change in Worm for Lyle Gun. *Id.*, 522.

1887. Report on the Trial of Gruson's Chilled Cast Iron Armor at Spezia, Italy, April 20–29, 1886. 4to, pp. 20, with plates. Washington.

1887. Construction Report on Body for 12-inch B. L. Rifle, Hooped and Tubed with Steel. *Rept. Chief of Ordnance*, 1887, App. 20.

1887. (With Lieut. H. D. Borup, Ord. Dept. U. S. A.) Construction Report on 12-inch B. L. Rifled Mortar, Cast Iron, Hooped with Steel. *Id.* App. 22.

1887. Annual Report of Inspector of Ordnance at South Boston Foundry. *Id.* App. 35.

1889. Construction Report on the Cast Iron B. L. Rifle, Steel Tubed. *Rept. Chief of Ordnance, U. S. A.*, 1889. App. 19.

1889. Construction Report on the 12″ Cast Iron Mortar. *Rept. Chief of Ordnance, U. S. A.*, 1889. App. 33.

1890. Report on Military and Life-Saving Material at the Paris Exposition of 1889. *In Vol. IV. Rept. U. S. Commissioner General at the Paris Exposition of* 1889.

1891. Annual Report of the Inspector of Ordnance at Midvale Steel Works, Philadelphia, Pa. *Rept. Chief of Ordnance, U. S. A.*, 1891. App. 25.

1892. Progress Report on Manufacture of Steel Forgings, etc., at the Midvale Steel Works, Phila., Pa. *Rept. Chief of Ordnance, U. S. A.*, 1892. App. 35.

**Macfarlane, Wm. W.**, S. B., V. (M. I. T.) 1879.

1889. (With P. S. Clarkson.) The Action of Chlorine on Hæmatoxylin and the Extractive Matter of Logwood. *Jour. Frank. Inst.*, cxxix.

**Main, Charles T.**, S. B., II. (M. I. T.) 1876. Asst. 1877–79.

1886. Notes on Mill Construction. Prepared for the Use of Students in the Mass. Institute of Technology. Pph. 8vo, pp. 60. Boston.

1886. Relative Cost of Steam and Water Power. Prepared for the Use of Students in the Mass. Institute of Technology. Pph. 8vo, pp. 8. Boston.

1889. On the Use of the Compound Engine for Manufacturing Purposes, the Relative Areas of the Cylinders and the Regulation of Pressure in the Receiver. *Trans. Am. Soc. Mech. Eng.*, x, 48.

1890. Cost of Steam and Water Power. *Id.*, xi, 108.

1892. Value of Water Power. *Id.*, xiii, 140. Also *Cassier's Mag.*, ii, 26.

**Maltby, Margaret E.**, A. M., S. B., VIII. (M. I. T.) 1891.

1892. (With C. R. Cross). On the Least Number of Vibrations Necessary to Determine Pitch. *Proc. Am. Acad.*, xxvii, 222. Also *Tech. Quar.*, v, 213.

**Mann, Bertram H.**, S. B., VI. (M. I. T.) 1890.

1892. The Insulation Resistance of Rail Circuits in Railroad Signaling. *Tech. Quar.*, v, Nos. 1 and 2.

**Mansfield, Albert K.** Stud. 1869–1872.

1875. On the Strength of Pulley Arms. *Jour. Frank. Inst.*, Sept., 1875.

1876. Isochronous Governors. *Id.*, Oct., 1876.

1877. Teeth of Internal Gears. *Id.*, Jan., 1877.

1877. On Refraction Tables. *Proc. Am. Philos. Soc.*, Jan., 1877.

**Mansfield, Arthur N.**, S. B., VIII. (M. I. T.) 1891.

1893. (With C. R. Cross.) An Investigation of the Excursion of the Diaphragm of a Telephone Receiver. *Proc. Am. Acad.*, xxviii, 93.

**Mansfield, Geo. W.**, S. B., III. (M. I. T.) 1882.

1888. The Electric Motor in Mining Operations. *Trans. Am. Inst. Min. Eng.*, xvi, 851.

1889. Electric Railways. *Elec. Eng.*, viii, 412.

1890. Single and Double Trolley Wire Systems for Electric Railways. *Id.*, ix, 320.

1891. The Dependent Overhead or Underground System of Electric Motive Power. *Elec. Power*, iii, 415.

1891. Relative Value of Steam and Street Railways. *Proc. Soc. Arts*, 1890–91, 131.

**Martin, Henry**, S. B., V. (M. I. T.) 1885. Asst. 1885–87.

1889. (With T. M. Drown.) The Determination of Organic Nitrogen in Natural Waters by the Kjeldahl Method. *Tech. Quar.*, ii, 277.

**Mason, Sampson D.**, S. B., I. (M. I. T.) C. E., 1870.

1889. History of a High Viaduct. [Paper read before Civ. Eng. Soc. of St. Paul, Minn.] *Jour. Ass. Eng. Soc.*, April, 1889.

**May, William C.**, S. B., V. (M. I. T.) 1873. Died, 1878.

1873. The Determination of Lead as Peroxide. *Am. Jour. Sci.* [3], vi, 255–257.

**Merrell, Chas.**, S. B., V. (M. I. T.) 1888.

1888. On Salol. *Western Druggist*, 1888.

1888. On Hydrastine. *Id.*, 1888.

**Metzler, William H.**, Ph. D. Instr. 1892 —.

1892. On the Roots of Matrices. *Am. Jour. Math.*, xiv, 326. Also pph. Baltimore.

1893. On Certain Properties of Symmetric Skew and Orthogonal Matrices. *Am. Jour. Math.*, xv. Also pph.

**Miller, Edward F.**, S. B., II. (M. I. T.) 1886. Asst. 1886–8; Instr. 1888–92; Asst. Prof. 1892 —.

1892. (With C. H. Peabody.) Tests on the Triple Engine at the Mass. Institute of Technology. *Tech. Quar.*, v, 255. Also *Trans. Am. Soc. Mech. Eng.*, xiv.

1893. (With C. A. Reed.) Measuring Steam by the Flow through an Orifice. *Tech. Quar.*, v.

**Minot, Charles Sedgwick**, S. B., V. (M. I. T.) 1872. S. D. (Harv.) 1878; Lecturer 1885–86.

1869. Description of the Male of Hesperia Metea. *Proc. Bost. Soc. Nat. Hist.*, xii, 319, 320.

1869. Upon the Limits of Genera. *Id.*, xii, 380.

1869. American Lepidoptera: Geometridæ. *Id.*, xiii, 83–85.

1869. Brief Notes on the Transformations of Several Species of Lepidoptera. *Canadian Entomologist*, ii, 27–29. [Correction in Vol. iv, 160.]

1869. American Lepidoptera: Phalænidæ. *Proc. Bost. Soc. Nat. Hist.*, xiii, 169–171.

1870. Notes on the Flight of New England Butterflies. *Id.*, xiv, 55, 56.

1870. Cabbage Butterflies. *Am. Entomologist*, ii, 74–76.

1872. Notes on Linnocheres Bimacula. *Can. Entomologist*, iv, 150.

1872. Microphotography. *M. I. T. Prest's Rep.*, 1872, 101, 102.

1874. The Influence of Anæsthetics on the Vaso-Motor Centres. *Bost. Med. and Surg. Jour.*, xc, 493–498. 4 plates.

1876. Recherches Histologiques sur les Trachées de l'Hydrophilus Picens. *Arch. Phys. Nor. Pathol.* [**2**], iii, 1–10. 2 Plates.

1876. Die Bildung der Kohlensäure innerhalb des ruhenden und des erregten Muskels. *Ludwig's Arbeiten*, xi. 1–24.

1876. Transfusion and Autotransfusion. *Bost. Med. and Surg. Jour.*, xciv, 741–743.

1876. Studien an Turbellarien. Beiträge zur Kenntniss der Plathelminthen. *Semper's Arbeiten*, iii, 405–471. 5 plates.

1876. Relationship between Worms and Vertebrates. *Proc. Bost. Soc. Nat. Hist.*, xix, 1.

1876. On the Classification of the Lower Worms. *Id.*, xix, 17–25.

1877. On the Formation of the Germinal Layers and the Phenomena of Impregnation among Animals. *Id.*, 165–171.

1877. The Sledge Microtome. *Am. Naturalist*, xi, 204–209.

1877. The Study of Zoölogy in Germany: I. The Laboratories. *Id.*, xi, 330–336: II. The Methods Used in Histology and Embryology. *Id.*, xi, 392–406.

1878. Experiments on Tetanus. *Jour. Anat. Physiol.*, xii, 297–339. 4 plates.

1878. A Lesson in Comparative Histology. *Am. Naturalist*, xii, 339–347. 1 plate.

1878. On Distomum Craissicolle: with Brief Notes on Huxley's Proposed Classification of Worms. *Mem. Bost. Soc. Nat. Hist.*, iii, 1–12. 1 plate.

1878. Report on the Fine Anatomy of the Locust. *First Annual Report U. S. Entomol. Commission*, 273–277. 1 plate.

1879. Growth as a Function of Cells. *Proc. Bost. Soc. Nat. Hist.*, xx, 190–201.

1879. Preliminary Notice of Certain Laws of Histological Differentiation. *Id.*, xx, 202–209.

1879. On the Conditions to be Filled by a Theory of Life. Abstract. *Proc. Am. Assoc.*, xxviii, 411–414.

1880. Human Growth. *Bost. Med. and Surg. Jour.*, ciii, 79–82.

1880. Changes of Circulation during Cerebral Activity. *Pop. Sci. Monthly*, xvii, 303–311.

1880. A Sketch of Comparative Embryology. *Am. Naturalist*, xiii, pages as below:—

I. History of the Genoblasts, and the Theory of Sex. pp. 96–108.

II. The Fertilization of the Ovum. Pp. 242–245.

III. Segmentation and the Formation of the Gastrula. Pp. 245–249.

IV. The Embryology of Sponges. Pp. 479–485.

V. The General Principles of Development. Pp. 871–880.

1880. The Lowest Animals. Review of Leidy's Fresh Water Rhizopods. *International Review*, viii, 646–651.

1880. Studies on the Tongue of Reptiles and Birds. *Anniversary Mem. Bost. Soc. Nat. Hist.*

1880. Review of Balfour's Comparative Embryology. Volume I. *New York Med. Jour.*, xxxii, 630–635.

1881. Histology of the Locust (Caloptenus) and the Cricket (Anabrus). *Second Rept. U. S. Ent. Com.*, 183–222.

1881. Some Recent Investigations of the Histology of the Scala Media Cochleæ. *Am. Jour. Otology*, April, 1881. 1 plate.

1881. Comparative Morphology of the Ear. Part I. The Medusæ. *Am. Jour. Otology*, July, 1881.

1881. Is Man the Highest Animal? *Progress of Science*, i, 271, 272.

1881. Mounting Chick Embryos Whole. *Am. Naturalist*, xv, 842.

1881. Review of Balfour's Embryology. Volume II. *Bost. Med. and Surg. Jour.*, —.

1881. Comparative Morphology of the Ear. Part II. *Am. Jour. Otology*, Oct., 1881.

1881. A Grave Defect in our Medical Education. *Bost. Med. and Surg. Jour.*, 1881.

1881. Huxley's Writings. *Intern. Review*, Dec., 1881.

Also, various reviews of scientific books in the *Christian Union*, 1881.

1882. Review of Balfour's Comparative Embryology. Vol. II. *N. Y. Med. Jour.*, xxxv, 152–156.

1882. Comparative Morphology of the Ear. Part III. *Am. Jour. Otology*, v. Part IV. *Id.*, v, 89–101.

1882. Charles Robert Darwin. *Bost. Med. and Surg. Jour.*, cvi, 402.

1882. Reports on General Physiology. *Id.*, cvi, 440; cviii, 409.

1883. Theorie der Genoblasten. *Biol. Centralb.*, ii, 365.

1883. Review of Anatomical Technology as applied to the Domestic Cat. *The Nation*, Jan. 25, 1883.

1883. Early Development of Reptiles. *Science*, i, 15.

1883. Anatomy and Histology of Polyopthalmus. *Id.*, i, 96, 97.

1883. Researches on the Dicyemidæ. *Id.*, i, 392.

1883. Composition of the Mesoderm. *Id.*, ii, 11.

1883. Primitive Streak of Vertebrates. *Id.*, ii, 105.

1883. Balfour's Last Researches on Peripatus. *Id.*, ii, 306.

1883. Histology of Insects. *Id.*, ii, 430–433.

1883. Natural Traits of Science. *Id.*, 455.

1883. Origin of the Mesoderm. *Id.*, ii, 815–818.

1883. The Fœtal Envelopes. (Lecture.) *Bost. Med. and Surg. Jour.*, cviii, 409.

1883. Retrogressive History of the Fœtus. (Lecture.) *Id.*, cviii, 529.

1884. Report on the Anatomy of Aletia Xylina. With Edward Burgess. *Fourth Rept. U. S. Entomol. Comm.*, 45–48. Parts vi–xi.

1884. The Laboratory in Modern Science (Editorial). *Science*, iii, 172–174.

1884. An International Scientific Association. *Id.*, iii, 245, 246.

1884. Morphology of the Pelvis and Leg. *Id.*, iii, 324.

1884. Development of the Thyroid and Thymus Glands and the Tongue. *Id.*, iii, 725.

1884. The Organization of an International Scientific Association. *Id.*, iv, 80.

1884. Proceedings of the Section of Histology and Microscopy, A. A. A. S., Phila. 1884. *Id.*, iv. 342, 343.

1884. Comment on Microscopical Technique. *Id.*, iv, 350, 351.

1884. Psychical Research in America. *Id.*, iv, 369, 370.

1884. Death and Individuality. *Id.*, iv, 398–400.

1884. Comments on Coöperation in Science. *Id.*, iv, 411.

1884. Researches on Growth and Death. *Proc. Soc. Arts, M. I. T.*, 1883–84, 50–56.

1884. Zur Kenntniss der Samenblasen beim Meerschweinchen. *Arch. für Mikros. Anat.*, xxiv, 211–215.

1885. The Effect of Cold on Living Organisms. *Science*, v, 522.

1885. The Formative Force of Organisms. *Id.*, vi, 4–6.

1885. Darwin's Biography. *Id.*, vi, 27.

1885. Color Associations with Months. Note. *Id.*, vi, 82.

1885. Has Man a Tail ? *Id.*, vi, 92.

1885. A New Endowment for Research. *Id.*, vi, 144.

1885. Physiology of the Brain. *Id.*, vi, 521.

1885. Review of "The Microscope in Botany." *Bost. Med. and Surg. Jour.*, Sept. 1, 1885.

1885. Report on Histology and Embryology. *Id.*, cxiii, 30.

1885. Researches on Growth and Death (Abstract). Biological Problems (Abstract). Vesicular Geminalis of the Guinea Pig (Abstract). On the Skin of Insects (Abstract). *Proc. Am. Asso.*, 1884, 517–521.

1885. American Society for Psychical Research. *The Evening Post*, N. Y., Jan. 10.

1885. Branch V. Vermes. *Standard Natural History*, Ed. by J. S. Kingsley. Vol. I., 185–225.

1885. Some Histological Methods. *Am. Nat.*, 828–830; 916, 917.

1885. The Early Stages of Human Development. Part I. Ova of the Second Week of Pregnancy. *N. Y. Med. Jour.*, xlii, 197–200. Part II. Embryos of the Third Week. *Id.*, 396–401.

1885. The following Articles in Wood's Reference Handbook of the Medical Sciences, I.: Age, Allantois, Amnion, Area, Bioplasson, Blastoderm, Blastopore.

1886. Text-Books on Methods in Microscopic Anatomy. Note. *Science*, vii, 100.

1886. The Rotifera. Review. *Id.*, vii, 402.

1886. Structure of the Human Skin. *Am. Naturalist*, 1886, 575.

1886. The Physical Basis of Heredity. *Science*, viii, 125.

1886. The Early Stages of Human Development. *N. Y. Med. Jour.*, 42, 197, 396.

1886. Report on Histology and Embryology. *Bost. Med. Surg. Jour.*, 113, 30, 114, 460.

1886. The Number Habit. *Proc. Am. Soc. Psych. Research*, i, 86.

1886. Notes on Histological Technique. *Zeit. f. wiss. Mikroscopie u. f. mikr. Techn.*, 3, 173.

1886. Zur Kenntniss der Insektenhaut. *Arch. f. mikr. Anatomie*, xxvii, 37.

1886. W. A. Lacy's Embryologie der Spinnen. *Biol. Centralblatt*, vi, 559–562.

1886. Muscle-Reading by Mr. Bishop. (Unsigned.) *Science*, viii, 506, 507.

1886. Researches on Snake Poison. (Editorial.) *Bost. Med. and Surg. Jour.*, cxv, 554, 555.

1886. Whence Come Race-Characters? (Signed M.) *Science*, viii, 623, 624.

1886. Abstracts of Five Papers: Organization and Death; A New Membrane of the Human Skin; The Structure of the Human Placenta; Morphology of the Supra-Renal Capsules; Evolution of the Lungs. *Proc. Am. Asso.*, xxxiv, 311–313.

1886. The following Articles in Wood's Reference Handbook of the Medical Sciences, II.: Chorion; Coclorn; Decidua; Ear, Development of; Ectoderm; Embryology; Entoderm; Evolution of Man.

1886. The following Articles in Wood's Reference Handbook of the Medical Sciences, III: Fœtus, Development of; Gastrula; Germ Layers; Growth.

1887. Bemerkungen zu dem Schrœder'schen Uteruswerke. *Anat. Anzeig.*, ii, 19–22.

1887. American Society for Psychical Research. *Science*, ix, 50, 51.

1887. Youthfulness in Science. *Id.*, ix, 104, 105.

1887. The following Articles in Wood's Reference Handbook of the Medical Sciences, Vol. IV.: Impregnation; Longevity; Meconium; Mesoderm.

1887. Report on Histology and Embryology. *Bost. Med. and Surg. Jour.*, cxvi, 520.

1887. The Rotifera. *Science.*

1887. The following Articles in Wood's Reference Handbook of the Medical Sciences, Vol. V.: Notochord: Ovum; Neurentic Canals; Placenta, Anatomy of.

1887. American Microscope. A complaint. *Science*, x, 275.

1888. First Report of the Committee on Experimental Psychology (Prevalence of Superstitions). *Proc. Amer. Soc. Psych. Research*, i, 218.

1888. Tricks in Mind Reading. *Youth's Companion*, lxi, 122.

1888. The Mounting of Serial Sections. *The Microscope*, May, 1888.

1888. Growth and Age. *Sajon's Annual of the Universal Med. Science*, v, 359.

1888. The following Articles in Buck's Reference Handbook, VI.: Proamnion; Segmentation of the ovum; Senility; Sex; Spermatozoa.

1889. The following Articles in Buck's Reference Handbook, VII.: Umbilical cord.

1889. Growth and Age. *Sajon's Annual of Med. Sci.*, ii, S. L. pp. 2.

1889. Second Report on Experimental Psychology. Upon the digram tests. *Proc. Amer. Soc. Psychical Research*, i, 218.

1889. Open letter concerning Telepathy. *Proc. Amer. Soc. Psych. Research*, i, 547.

1889. Uterus and Embryo. I. Rabbit; II. Man. *Jour. Morph.*, ii, 341. Pls. xxvi–xxix.

1889. The following Article in Buck's Reference Handbook, VIII, Yolk-sac.

1889. Segmentation of the ovum with especial reference to the Mammala. *Am. Nat.*, xxiii, 463–481; 753–769.

1890. The use of the Microscope and the value of Embryology *Canadian Practioner.*

1890. The National Medical Dictionary by J. S. Billings, assisted by Dr. C. S. Minot et al. 2 vols. 8vo.

1890. Die Placenta des Kaninchens. *Biol. Centralbl.*, x, 114.

1890. Die Entstehung der Arten durch räumliche Sonderung von Moritz Wagner (Review). *Science*, xlv, 380.

1890. Evolution of the Medullary Canal. *Am. Nat.*, xxiii, 1019.

1890. Growth and Age. *Sajon's Annual of the Med. Science*, ii, pp. 4.

1890. Concrescence. Theory of the Vertebrate Embryo. *Am. Nat.*, xxiv, 501, 617.

1890. The Mesoderm and the Cœlom of Vertebrates. *Am. Nat.*, xxiv, 877.

1890. Zur Morphologie der Blutkörperchen. *Anat. Anz.*, v, 601. Translation. *Am. Nat.*, xxiv, 1020.

1890. About Worms. *Youth's Companion*, lxiii. 681.

1890. On the Fate of the Human Decidua reflexa. *Anat. Anz.*, v, 639.

1890. On certain Phenomena of Growing Old. *Proc. Am. Assoc. Adv. Sci.*, xxix.

1891. A Theory of the Structure of the Placenta. *Anat. Anz.*, vi, 125.

1891. Senescence and Rejuvenation: On the Weight of Guinea Pigs. *Jour. Physiol.*, xii, 97. Pl. i–iii.

1891. Growth and Age. *Ann. Univ. Med. Sci.*, ii. n–7.

1892. Human Embryology. 8vo. pp. xxiii, 815. New York.

**Moody, Herbert R.**, S. B., V. (M. I. T.) 1892. Asst. 1892—.

1892. (With Henry P. Talbot.) On the Properties of Hydrogen Peroxide Solutions. *Tech. Quar.*, v, 123.

**Morey, Chas. A.**, Stud. 1872–74.

1874. The Phonautograph. *Am. Jour. Sci.*, cviii, 130.

1875. Many articles on Experimentation. *Ohio Sch. Jour.*, *N. E. Jour. Ed.*, etc.

**Morgan, Frank H.**, S. B., V. (M. I. T.) 1878. Asst. 1878–79. Died, 1889.

1878. (With W. B. Allbright and J. G. Woolworth.) Sur l'action

du chlorure d'éthyle sur la benzine en présence du chlorure d'aluminium. *Comptes rendus*, lxxxvi, 887.

1888. A Burette Flask. *Jour. Anal. Chem.*, ii, 1.

1888. Kerosene and Gas as Protectors of Oxidizable Solution. *Id.*, ii, 164.

1888. New Indicators in Reduction of Ferric Chloride by Stannous Chloride. *Id.*, ii, 169.

1888. Progress in Chemical Methods of Sanitary Water Analysis. *Id.*, ii, 393.

1888. (With E. Butes.) Rapid Determination of $N_2 O_5$ in Nitrates. *Id.*, ii, 384.

1888. Some Notes on Progress in Chemical Methods of Water Analysis, with Special Reference to the Ammonia Process. *Proc. Am. Ass.*, xxxvii, 127.

**Morse, Frank B.**, S. B., I. (M. I. T.) 1873. Instr. 1873–76.

1875. Report on 1st Year's Free-Hand Drawing. *M. I. T. Prest's Rep.*, 1875, 36–38.

1886. Method of Mining and Milling in the Willard Mine. *Report of State Mineralogist*, Col., 1885–86.

**Mudge, Henry N.**, Instr. 1873–80.

1875. Report of 1st Year's Mechanical Drawing. *M. I. T. Prest's Rep.*, 1875, 39–43.

1877. Report on Mechanical Drawing. *Report of School Committee of City of Boston.* City Doc., No. 25, 15, 16.

**Mulliken, S. P.**, S. B., V. (M. I. T.) 1887, Ph. D. (Leipzig) 1890.

1890. Ueber die Konstitution der Chlorzimmtsäuren. [Inaugural Dissertation.] Leipzig, 1890. 8vo, pp. 35.

1890. The Geometrical Isomerism of the Chlorcinnamic Acids. *Tech. Quar.*, iv, 170.

**Munroe, James P.**, S. B., III. (M. I. T.) 1882.

1888. The Beginning of the Mass. Institute of Technology. *Tech. Quar.*, I, 285.

1888. The Education of the Masses. *New Princeton Review*, vi, 346.

1888. Scientific Note and Comment. *Boston Post*, Jan.–Sept., 1888.

1889. College Graduates. *Tech. Quar.*, ii, 209.
1890. Editor. *Tech. Quar.*, Vol. iii.
1890. Washington's Dinner at the Munroe Tavern, Nov., 1789. *Proc. Lexington Hist. Soc.*, i, xlix.
1891. (With C. A. Staples and C. O. Smith.) Lexington: A Handbook of its Points of Interest, Historical and Picturesque. 8vo, pp. 75.
1892. Certain Dangerous Tendencies in Education. *Educational Review*, iii, 145.

**Neiler, S. G.**, Stud. 1884–86.
1891. Reactive Coils. *Elec. Eng.*, Dec. 30, 91.
1892. Electric Lighting Handbook, compiled for the engineering department of the Thomson Houston Elec. Co.

**Newell, Frederick H.**, S. B., III. (M. I. T.) 1885.
1885. Permeability of Sand Rock. *Eng. and Min. Jour.*, xl, 79.
1886. Late Methods of Drilling for Oil and Natural Gas. *Proc. Soc. of Arts, M. I. T.*, 1885–86, 53.
1891. Results of Stream Measurements of the U. S. Geological Survey. *Trans. Am. Inst. Min. Eng.*, xx, 547.
1891. Irrigation in Arizona. *Eleventh Census of U. S. Bulletin No.* 35. Also in *Tech. Quar.*, iv, 46.
1891. Irrigation in New Mexico. *Eleventh Census of U. S., Bulletin No.* 60.
1891. Irrigation in Utah. *Eleventh Census of U. S., Bulletin No.* 85.
1891. Irrigation in Wyoming. *Eleventh Census of U. S., Bulletin No.* 107.
1891. Irrigation in Montana. *Eleventh Census of U. S., Bulletin No.* 153.
1892. Irrigation in Idaho. *Eleventh Census of U. S., Bulletin No.* 157.
1892. Irrigation in Nevada. *Eleventh Census of U. S., Bulletin No.* 163.
1892. Irrigation in Oregon. *Eleventh Census of U. S., Bulletin No.* 178.
1892. Artesian Wells for Irrigation. *Eleventh Census of U. S., Bulletin No.* 193.

1892. Irrigation in Washington. *Eleventh Census of U. S., Bulletin No.* 198.

1892. Irrigation in Western United States. *Extra Census Bulletin No.* 23.

1892. Irrigation work of the United States Geological Survey. *Irrigation Age*, i, p. 10.

1892. Utah Lake Reservoir, Utah. *Id.*, i, 42, 69, 153.

1892. Bear River, Utah. *Id.*, Vol. 2, p. —.

1892. The Geological Survey, Its Work in Irrigation. *Id.*, ii, p. 455.

1892. Hydrography of the Acid Regions. *12th Annual Report of the U. S. Geological Survey*, Part 2.

1892. Water Supply for Irrigation. *13th Annual Report of the U. S. Geological Survey*, Part 3.

1892. Artesian Wells. *Johnson's Cyclopedia.*

1892. Well Boring. *Id.*

1893. The Rio Grande. *Trans. Am. Society Irrigation Engineers.* 1893.

1893. Irrigation in the United States. *Final Report of Eleventh Census of U. S.*

1893. The Work of the U. S. Geological Survey in Kansas. *Report of State Board of Agriculture, Kansas*, 1893.

**Nichols, William R.**, S. B., V. (M. I. T.) 1869. Stud. Asst. 1868–69; Instr. 1869–70; Asst. Prof. 1870–72; Prof. 1872–86; Died, 1886.

1868. On the Chromites of Magnesium. *Am. Jour. Sci.* [**2**], xlviii, 16-20.

1869. On the Composition of the Acid Oxalates of Potassium, Ammonium and Sodium. [With next title, Graduating Thesis.] *Proc. Am. Assoc.*, xviii, 159–163.

1869. On the Solubility of the Oxalates of Sodium, Potassium, and Ammonium. *Id.*, xviii, 163–169.

1870. Annual of Scientific Discovery for 1869. See Trowbridge, J.

1870. Action of Cochituate Water on Lead Pipes. *Rept. Mass. State Board of Health*, ii (1871), 32–40.

1870. Report of Examination of Mystic Pond and its Sources of Supply. *Id.*, ii (1871), 387–390.

1871. Annual of Scientific Discovery for 1870. As in 1870.

1872. (With George Derby, M. D.) Sewerage; Sewage; The Pollution of Streams; The Water Supply of Towns. *Rept. Mass. State Board of Health*, iv (1873), 19–132.

1872. An Elementary Manual of Chemistry. Abridged from Eliot and Storer's Manual, with the coöperation of the authors. 12mo, pp. 287 and lxiii. New York. Several later editions.

1872. A Compendious Manual of Qualitative Analysis, by Charles W. Eliot and Frank H. Storer. Revised, with the coöperation of the authors, by W. R. N. 12mo, pp. 128 and lii. New York. Several later editions.

1873. On the Present Condition of Certain Rivers of Massachusetts, etc. *Rept. Mass. State Board of Health*, v (1874), 61–152.

1874. On the Waters of Flax Pond and its Tributaries. *Rept. of Joint Standing Com. of City Council, Chelsea, Mass.*, Dec. 28, 1874.

1874. Report on the Department of General Chemistry. *M. I. T. Prest's Rep.*, 1874, 1–5.

1874. On the Composition of the Ground-Atmosphere; and some Examinations of the Air in Smoking Cars. *Rept. Mass. State Board of Health*, vi (1875), 205–224, 229–235. Printed together. Pph. 8vo, pp. 25. Boston, 1875.

1875. List of Count Rumford's Works in the Complete Works of Rumford, published by the American Academy (4 vols., 8vo), Vol. iv, 796–820. Also, translations of various papers from the French and German, and the Index to the four volumes.

1875. Observations on the Composition of the Ground-Atmosphere in the Neighborhood of Decaying Organic Matter. *Rept. of Sewerage Commission.* Boston, 1875, 35–39, 41.

1875. Report on Chemical Examination of Bitters, etc. *Rept. City Board of Health, Boston*, iii (1875), 97–105.

1875. Report to the Water Commissioners of Yonkers, N. Y. *Rept. Water Commissioners*, iii (1875), 34–38.

1876 (With W. G. Farlow and E. Burgess.) On a Peculiar Condition of the Water Supplied to the City of Boston, 1875–1876. *Rept. Coch. Water Board*, 1876.

1876. Address of Welcome to American Public Health Association, Boston Meeting. *Reports and Papers, Am. Pub. Health Assoc.*, iii, 221, 222.

1877. On the Condition of the Water of Springfield, Mass., during 1876. *Rept. of Water Commissioners, Springfield*, 1877.

1877. Report on Matters Connected with the Boston Water Supply. *Rept. Boston Water Board*, i (1877), 11–15,

1877. Circular of Information about certain Fresh Water Algæ. [Printed for private distribution.] Also, in *Rept. Cambridge Water Board*, 1877, 8–13.

1877. On the Filtration of Potable Water. *Rept. Mass. State Board of Health*, ix (1878), 137–236. Reprinted separately, cloth, 8vo, pp. 93. New York, 1879.

1878. On the Condition of the Springfield Water during 1877, with an Account of Some Experiments on Filtration. *Rept. of Water Commissioners, Springfield*, 1877.

1878. Chemical Examination of Sewer Air. *Rept. of Supt. of Sewers, Boston*, 1878. A supplementary report was subsequently privately printed, pp. 4. [1879.]

1879. Report on a Peculiar Taste and Odor of the New London (Conn.) Water. *Rept. New London Water Commissioners*, 1880, pp. 27–30. An Extract was printed separately, pp. 2. [1880.]

1879. The Water-Supply of the Kingdom of Würtemberg. Review. *Jour. Frank. Inst.* [3], lxxvii, 54–56.

1879. On the Absorbing of Soup from a Slaughter House (Belmont, Mass.) by means of Muck. *Rept. Mass. State Board of Health*, xi (1879), 6–11.

1879. On the Deterioration of Library Bindings. *Lib. Jour.*, iv, 435–438.

1879. On Drinking Water and Public Water Supplies. Paper in *Buck's Hygiene*, i, 209–313.

1879. Report on the Boston Water Supply. *Rept. Boston Water Board*, iii, 32–35.

1879. Report on the New Bedford Water Supply. *Rept. of Acushnet Water Board, New Bedford*, x, 21–23.

1879. Pollution of a Stream by Sulphuric Acid. *Rept. State Board of Health, Lunacy, and Charity*, i, Supp., 19–21.

1879. Observations on Fresh Pond, Cambridge, Mass. *Id.*, i, Supp., 95–107.

1880. On the Examination of Mystic Water, with remarks on Frankland's Process of Water Analysis. *Id.*, i, Supp., 109–120.

1880. Report on the Water of Winchester, Mass. *Annual Rept. of Water Commissioners, Winchester, Mass.*, 1879–80, 14, 15.

1880. Report on the Boston Water Supply. *Rept. Boston Water Board*, iv, 38–45.

1880. On the Temperature of Fresh Water Lakes and Ponds. *Proc. Bost. Soc. Nat. Hist.*, xxi, 53–81.

1880. On the Sanitary Condition of certain School Houses. Report to the Committee on Public Buildings. *Boston City Doc.*, No. —, 1880, pp. 12.

1880. On the Examination of various Samples of Mud from Charles River, etc. *Rept. Boston City Board of Health*, viii (1879–80), 12–18.

1881. On the Character of the Sewage discharging into Lower Mystic Pond. *Rept. Boston Water Board*, v, 54–56.

1881. On Sand Filtration at Berlin. Review. *Jour. Frank. Inst.*, Dec., 1881.

1881. Some Remarks on the Odors and Tastes of Surface Water. Read before Boston Society of Civil Engineers, Dec. 21, 1881. *Jour. Assn. Eng. Societies*, i, Jan., 1882.

Also, various minor communications in the Reports of the City and State Boards of Health, and in the Water Reports of a number of cities and towns of New England and the Middle States.

1882. Publications of the Mass. Institute of Technology, its Officers, Students, and Alumni, 1862–1881. A Compilation. Pph. 8vo, pp. 50. Boston.

1882. Natural Filtration at Berlin. *Jour. Frank Inst.*, March, 1882.

1883. Water Supply, mainly from a Chemical and Sanitary Standpoint. 8vo, pp. 6+232. New York.

1883. Introduction to Thomsen's Thermochemische Untersuchungen. Translation. *Pop. Sci. Monthly*, xxiii, 770.

1883. On the Use of Lead for Conveying and Storing Water. A

series of articles in *Sanitary Engineer*, beginning Nov. 15, 1883.

1884. On the Filtration of certain Saline Solutions through Sand. *Jour. Assn. Eng. Societies*, June, 1884.

1884. On Iron as a Material for Purifying Potable Water. *The Sanitary Engineer*, x, 220.

1884. (With L. M. Norton.) Laboratory Experiments in General Chemistry, compiled for the Use of Students of the Mass. Institute of Technology. Pph. 12mo, pp. 58 and viii. Boston, 1884, 1885, 1886, 1887.

1885. (With W. T. Sedgwick.) Report on Illuminating Gas. *Mass. Pub. Doc., Senate No.* 60. Feb., 1885, pp. 6, 8vo.

1885. Chemistry in the Service of Public Health. *Proc. Am. Asso.*, xxxiv. Also, reprinted, pph. 8vo, pp. 20. Salem, 1885.

1885. (With C. R. Allen.) Contributions to our Knowledge of Sewage. *Jour. Frank. Inst.*, Aug., 1885.

1885. (With P. D. Borden, Jr.) On a Case of the Rapid Exterior Corrosion of an Iron Water Main. *Jour. Asso. Eng. Societies*, iv, 274–284.

1886. The Micro-Membrane Filter. *Proc. Soc. Arts, M. I. T.*, 1885–86, 131.

1886. Report on Manufacturing Refuse. *Rept. Mass. Drainage Commission*, 1886, 231–236.

1888. Publications of the Mass. Institute of Technology, and of its Officers, Students and Alumni. Revised by L. M. Norton. Pph. 8vo, pp. 96. Boston, 1888.

1888. (With L. K. Russell.) The Action of Boston Water on Certain Sorts of Service Pipe. *Jour. Ass. Eng. Soc.*, Jan. 9, 1888.

**Niles, William H.**, Ph. B., A. M. Prof. 1871 —.

1871. Interesting Phenomena observed in Quarrying. *Proc. Bos. Soc. Nat. Hist.*, xiv, 80–87.

1872. Effect of Pressure on Rocks. *Id.*, xv, 1, 2.

1873. Some Remarks upon the Agency of Glaciers in the Excavation of Valleys and Lake Basins. *Id.*, xv, 378–381.

1873. On Some Expansions, Movements, and Fractures of Rocks, observed at Monson, Mass. *Proc. Am. Assoc.*, xxii, Pt. II, 156–163.

1873. Phenomena at Monson Quarry, Mass. *Proc. Bost. Soc. Nat. Hist.*, xvi, 41, 42.

1875. Physical Features of Massachusetts. *Id.*, xvii, 507, 508.

1875. Report on Instruction in Physical Geology and Geography. *M. I. T. Prest's Rep.*, 51–53.

1877. The Geological Agency of Lateral Pressure. *Proc. Bost. Soc. Nat. Hist.*, xviii, 272–284.

1878. Upon the Occurrence of Zones of Different Physical Features upon the Slopes of Mountains. *Id.*, xix, 324–330.

1878. Upon the Relative Agency of Glaciers and Sub-Glacial Streams in the Erosion of Valleys. *Id.*, xix, 330–336.

1880. Reports of Councillors for the Spring of 1880: Topography. *Appalachia*, ii, 179–181.

1882–87. Report of the Permanent Meteorological Committee. *Proc. Soc. Arts, M. I. T.*, 1882–83, 113; 1883–84, 112; 1884–85, 137; 1885–86, 130; 1886–87, 99.

1887. The Causes of the Recent Floods in Germany. *Proc. Soc. Arts, M. I. T.*, 1887–88, 101.

1890. Secular and Local Variations of Weather and Climates as affecting Water Supply. *Jour. N. E. Water Works Ass.*, v, 75.

**Norris, George L.**, S. B., III. (M. I. T.) 1887.

1890. A Rapid Method for Phosphorus in Iron and Steel, Modified from a Method Proposed by Dr. T. M. Drown. *Jour. Frank. Inst.*, Jan., 1890.

1891. Determination of Manganese in Manganiferous Slags and Ores. *Jour. Anal. Chem.*, v, 8.

1891. A New Absorption Bulb. *Jour. Anal. Chem.*, v, 10.

**Norton, Lewis M.**, Certif. Chem. 1875; Ph. D. (Gött). Asst. 1875–77; Instr. 1882–83; Asst. Prof. 1883–85; Asso. Prof. 1885–1893. Died, Apr. 1893.

1878. (With J. F. Elliott). Ueber die Einwirkung von Schwefelammonium auf Pikramid. *Ber. d. chem. Gesell.*, 1878, 327.

1878. (With A. Michael). Ueber die Einwirkung des Chlorjods auf Aromatische Amine. *Id.*, 1878, 107.

1879. Ueber die Einwirkung von Chlorjod auf die Amine der Benzolreihe. [Inaugural Dissertation.] Pph. 8vo, pp. 36. Göttingen.

1879. (With A. Michael). On the Action of Iodine Monochloride upon Aromatic Amines. *Am. Chem. Jour.*, i, 255–267.

1880. (With same.) On *a* — and *β* — Monobromcrotonic Acids. *Id.*, ii, 11–19.

1884. (With C. O. Prescott.) Continuous Etherification. *Id.*, vi, 241–246.

1884. (With W. R. Nichols.) Laboratory Experiments in General Chemistry, compiled for the Use of Students of the Mass. Institute of Technology. Pph. 12mo, pp. 58 and viii. Boston, 1884, 1885, 1886, 1887, 1888, 1889, 1890. Revised by F. L. Bardwell. pp. 65. 1891, 1892.

1885. Coal Tar, and the Colors Derived from it. *Proc. Soc. Arts, M. I. T.*, 1884–85, 29–33.

1885. Minor [Chemical] Investigations. *Am. Chem. Jour.*, vii, 114–120.

1885. (With A. W. Allen.) Ueber die Einwirkung der verdünnten Salpetersäure auf die Anilide. *Ber. d. chem. Gesell.*, xviii, 1885–1888.

1886. (With C. W. Andrews.) The Action of Heat on Liquid Paraffins. *Am. Chem. Jour.*, viii, 1–9.

1886. (With A. A. Noyes.) On the Action of Heat upon Ethylene. *Id.*, viii, 362.

1886. William Ripley Nichols (an obituary). *Id.*, viii.

1887. (With H. J. Williams.) On the Action of Bromine on Isobutylene. *Id.*, ix, 87.

1887. (With C. B. Kendall.) Preparation of Alizarine Assistant and its Action in Turkey-Red Dyeing. *Textile Record*, 1887, 227.

1887. (With W. D. Livermore.) Ueber die Einwirkung von verdünnter Salpetersäure auf Substituirte Amidoverbindungen. *Ber. d. chem. Gesell.*, 20, 2268.

1887. (With H. A. Richardson.) Ueber Leinölsäure. *Id.*, 20, 2735.

1887–88. The Dyeing of Cotton Yarn. *Textile Record.* A Series of Articles from June, 1887, to March, 1888.

1888. (With H. A. Richardson.) On the Fatty Acids of the Drying Oils. *Am. Chem. Jour.*, x, 57.

1888. Character and Effect of Illuminants Present in Coal Gas, *Tech. Quar.*, ii, 307.

1888. Natural Gas. *Proc. Soc. Arts, M. I. T.*, 1887–88, 74.

1888. (With W. R. Nichols.) Publications of the Mass. Institute of Technology and of its Officers, Students and Alumni. Revised by L. M. Norton. Pph. 8vo, pp. 96. Boston, 1888.

1888. Bleaching. A Series of Articles in the *Textile Record*, beginning May, 1888.

1888. (With A. A. Noyes.) Note on the Butines. *Am. Chem. Jour.*, x, 430.

1889. The Composition of Boston Gas. *Am. Gas-Light Jour.*, l, 303.

1889. Cutch and its Uses in Textile Coloring. *Textile Record* 1889, 34, 66.

1890. (With Herbert C. Tuttle.) Lactic Acid and Lactates in Textile Coloring. *Tech. Quar.*, iii, 287.

1890. Carbonization of Wool. *Textile Record*, xi, 64, 96.

1891. Notes upon the Estimation of Chlorine in Electrolyzed Solutions. *Tech. Quar.*, iv, 361.

1893. Articles in *Johnson's Cyclopedia* on Dyeing; Dyestuffs.

**Noyes, Arthur A.**, S. B., V. (M. I. T.) 1886, S. M. (M. I. T.) Ph. D. (Leipsic). Asst. 1887–88; Instr. 1890—.

1886. (With L. M. Norton.) On the Action of Heat on Ethylene. *Am. Chem. Jour.*, viii, 362.

1887. The Constitution of Benzol. *Tech. Quar.*, i, 79.

1887. On the Action of Heat on Isobutylene. *Tech. Quar.*, i, 278.

1888. (With L. M. Norton.) Note on the Butines. *Am. Chem. Jour.*, x, 430.

1888. Index to Literature of Butines and their Halogen Addition Products. *Tech. Quar.*, ii, 112.

1890. Ueber die gegenseitige Beeinflussung der Löslichkeit von dissociierten Körpern [Inaugural Dissertation]. Leipzig, 1890. 8vo, pp. 31.

1890. Abweichungen von den Gasgesetzen in Lösungen. *Zeit. f. physik. Chemie*, v, 53.

1890. Gegenseitige Beeinflussung der Löslichkeit von dissociierten Körpern. *Id.*, vi, 241.

1890. (With M. Le Blanc.) Vermehrte Löslichkeit. Anwen-

dung der Gefreirpunktbestimmungen zur Ermittelung der Vorgänge in Lösung. *Id.*, vi, 385.

1891. On the Determination of the Electrolytic Dissociation of Salts by Means of Solubility Experiments. *Tech. Quar.*, iv, 259.

1892. Notes on Qualitative Analysis. Prepared for the use of the classes of Mass. Institute of Technology. Cloth, 8vo, pp. 62. Boston, 1893.

1892. Ueber die Bestimmung der Electrolytischen Dissociation von Salzen mittelst Löslichkeitsversuchen. *Zeit. f. physik. Chemie*, ix, 603.

1893. Die Wasserstoffion-abspaltung bei den sauren Salzen. *Zeit. f. physik. Chem.*, xi, 4. Printed separately.

1893. On the Dissociation of Hydrogen Ions from Acid Salts. *Tech. Quar.*, v.

1893. (With A. A. Clement.) Ueber die elektrolytische Reduction des Nitrobenzols in Schwefelsäurelösung. *Ber. d. Chem. Gesell.*, xxvi, 990. Translation in *Tech. Quar.*, vi, No. 1.

1893. (With W. K. Gaylord.) The Effect of the Sulphuric Acid Group upon Developing Power. *Tech. Quar.*, vi, No. 1.

1893. Ueber die Bestimmung der elektrolytischen Dissociation von Salzen mittelst Löslichkeitsversuchen. *Zeit. f. physik. Chemie.*, xii, No. 2.

**Ordway, Evelyn M.** (née Walton), S. B., V. (M. I. T.) 1881.

1881. Liquefaction and Cold Produced by the Mutual Reaction of Solid Substances. *Am. Jour. Sci.* [**3**], xxii, 206–213.

**Ordway, John M.**, A. M., Prof. 1869–1884.

1873. Report on Vacation Excursion. *M. I. T. Prest's Rep.*, 1873, 41–58.

1874. Report of Instruction in Industrial Chemistry and Physiology. *Id.*, 1874, 65–68.

1874. (With R. H. Richards.) Report on Vacation Excursion to Lake Superior. *Id.*, 1874, 33–37.

1874. Analytical Table of Lindley's Natural Orders of Plants. Pph. 8vo, pp. 26.

1876. Report on Vacation Excursion. *M. I. T. Prest's Rep.*, 1876, 171–174.

1877. Analytical Table of Cryptogamous Plants. Prepared for Use of Students of Mass. Institute of Technology. Pph. 8vo, pp. 27. Boston.

1878. Experiments on Lubricating Oils. *Proc. N. E. Cotton Mfrs. Asso.*, Oct. 30, 1878.

1880. Artificial Alizarine. *Proc. Soc. Arts, M. I. T.*, 1879–80, 51.

1880. Address as Chairman of Chemical Sub-Section of the Am. Association. Read Aug. 25, 1880. *Proc. Am. Asso.*, xxix, 283–298.

1881. Ordinum Botanicorum Indagator. Analytical Guide to the Natural Orders of the Vegetable Kingdom. Printed for the Use of Students of the Mass. Institute of Technology. Pph. 8vo, pp. 94. Boston.

1882. Slöjd Schools. *Mass. Teachers' Asso.* 1881–82. *Addresses*, 1882.

1882. Handwork Instruction in Sweden. *46th Ann. Rept. Mass. State Board of Education*, 1881–82, 161–213.

1883. Education as Illustrated in the Nuremberg Industrial Exhibition. *Proc. Soc. Arts, M. I. T.*, 1882–83, 89–93.

1883. Report on the Covering of Steam Pipes, Special Report, No. 14, of the Boston Manufacturers' Mutual Fire Insurance Company. Pph. 8vo, pp. —. Boston, 1883.

1884. Non-Conducting Coverings for Steam Pipes. *Trans. Am. Soc. Mech. Eng.*, vi.

**Osborne, George A.**, S. B. Prof. 1866 —; Secy. of Faculty 1868-71.

1874. Report of Department of Mathematics. *M. I. T. Prest's Rep.*, 1874, 80.

1884. Differentiation of Functions. Pph. 8vo, pp. 40. Boston.

1886. Examples of Differential Equations, with Rules for their Solution. Cloth, sq. 12mo, pp. 50. Boston.

1889. The Differential Calculus applied to Plane Curves and Maxima and Minima. Pph. 12mo, pp. 73–82. Boston, 1889.

1890. Notes on the Differentiation of Functions, with Examples. Pph. 12mo, pp. 50, Boston.

1891. Treatise on the Differential and Integral Calculus with Examples and applications. Cloth, 12mo, pp. 282, xxi, Boston.

**Otis, Charles P.**, A. M., Ph. D. Prof. 1873–88. Died, 1888.

1874–77. Reports on Department of Modern Languages. *M. I. T. Prest's Rep.*, 1874, 51–64; 1875, 9–29; 1876, 50–57; 1877, 41–47.

1878, 1880, 1882. Translation of "Les Voyages de Champlain." Publications of "The Prince Society," Boston. Vols. i, ii, and iii.

1881 and 1883. Elementary German. 16mo, pp. 332. New York. Third edition, 1883.

1884. Outline of Middle High German Grammar. Pph. 8vo, pp. 40. Boston.

1885. Schiller's Das Lied von der Glocke. School edition, with Introduction and Notes. 12mo, pp. 70. New York.

1887. Brüder Grimm, Kinder and Hausmärchen. School edition, with Introduction, Notes, and Vocabulary. Cloth, 12mo, pp. 351. New York.

**Patterson, Geo. W., Jr.**, S. B., VI. (M. I. T.) 1887.

1888. Experiments on the Blake Contact. *Tech. Quar.*, i, 28, also *Proc. Am. Acad. of Arts and Science*, xv, 228.

1891. A New Method of Measuring Insulation Resistance. *Elec. Eng.*, May, 1891. Also *The Technic of the Univ. of Mich. Eng. Soc.*, 1891.

1892. A Graphical Method of Calculating the Equivalent Current in a Conductor. *The Technic*, 1892.

1893. Treatise on Industrial Photometry, by A. Palay, translated by G. W. Patterson, Jr.

**Peabody, Cecil H.**, S. B., II. (M. I. T.) 1877. Instr. 1883–84; Asst. Prof. 1884–89; Assoc. Prof. 1889 —.

1885. Notes on Governors and Fly Wheels. Pph. 8vo, pp. 19.

1886. Steam Engine Tests made in the Mechanical Engineering Laboratory of the Mass. Institute of Technology. *Trans. Am. Soc. Mech. Eng.*, vii.

1887. Notes on Valve Gears. Pph. 8vo, pp. 40. Boston.

1887. Notes in Thermodynamics and Steam Engine Experiments. Pph. 8vo, pp. 111 and 70. Boston.

1888. A New Colorimeter. *Jour. Frank. Inst.*, Aug., 1888.

1888. Tables of the Properties of Saturated Steam and Other Vapors. 8vo, pp. 36. New York, 1888.

1888. Pressure of Saturated Steam. *Tech. Quar.*, i, 416.

1888. A General Review of Steam Engine Tests. *Proc. Soc. Arts, M. I. T.*, 1887–88, 74.

1888. Refrigerating Machines. *Tech. Quar.*, ii, 325.

1889. Flow of Steam in a Tube. *Trans. Am. Soc. Mech. Eng.*, x, 316.

1889. A Simple Calorimeter. *Id.*, x, 327. Also *Tech. Quar.* ii, 33.

1889. Thermodynamics of the Steam Engine and other Heat Engines. Cloth 8vo, pp. 470. New York, 1889.

1889. Ueber die Abweichungen von den Gasgestegen in Lösungen.

1890. (With H. Kunhardt.) Flow of Steam through Orifices. *Trans Am. Soc. Mech. Eng.*, xi, 187.

1890. (With A. L. Williston.) Experiments on the Errors of Different Types of Calorimeters. *Trans. Am. Soc. Mech. Eng.*, xi, 193, also *Tech. Quar.*, iii. 37.

1891. Notes on the Steam Engine Indicator. Prepared for the use of students. Pph. 8vo, pp. 45, with cuts. Boston, 1891.

1891. Illustrations of Engines and Machines. Prepared for the use of students. Pph. 8vo, pp. 45. Boston, 1891. Also illustrations in separate cover. Pp. 111.

1891. Triple Expansion Experimental Engine. *Engineering* (London), Aug. 14, 1891. Also *Tech. Quar.*, iv, 238.

1891. Application of Hirn's Analysis to Multiple Expansion Engines. *Trans. Am. Soc. Mech. Eng.*, xii, 740. Also *Tech. Quar.*, iv, 245.

1892. Economy and Efficiency of the Steam Engine. *Id.*, xiii, 337.

1892. (With E. F. Miller.) Tests on the Triple Engine at the Mass. Institute of Technology. *Tech. Quar.*, v, 255.

1892. Valve Gears for Steam Engines. 8vo, pp. vi, 128. 18 folded plates. New York, 1893.

1893. A Duty Trial of a Pumping Engine built by the Geo F. Blake Manf. Co. *Jour. Frank. Inst.*, Mar., 1893.

**Pearson, A. H.** (Rev.) Stud. 1867–70; Stud. Asst. 1868–70; Certif. Chem. 1869.

1869. Estimation of Sulphur in Organic Compounds: Assay of Sulphur in Iron Pyrites. *Am. Jour. Sci.*, xlviii, 191–194.

1869. Estimation of Chromium as Chromate of Barium. *Id.*, xlviii, 198–200.

1869. On the Solubility of various Salts in several Saline Solutions. *Id.* [**2**], xlviii, 202–206.

1870. On the Amount of Carbonic Acid in the Air. *Rept. Mass. State Board of Health*, ii, 399–403.

**Phillips, Henry A.**, S. B., IV. (M. I. T.) 1873.

1892–3. Compendium of Comparative Municipal Building Laws. *Amer. Arch.*, series of articles 1892 and 1893.

**Phipps, David W.**, S. B., IX. (M. I. T.) 1876.

1876. Kant's Transcendental Aesthetic. [Graduating Thesis.] *Jour. Spec. Philos.*, xi, 299–310.

**Pickering, Edw. C.**, S. B. Asst. Instr. 1866–67; Asst. Prof. 1867–68; Prof. 1868–77.

1868. Dispersion of a Ray of Light Refracted at any Number of Plane Surfaces. *Proc. Am. Acad.*, vii, 478.

1868. Essay on the Comparative Efficiency of Different Forms of the Spectroscope. *Am. Jour. Sci.* [**2**], xlv, 301–305.

1869. Description of a Machine for Drawing the Curves of Lissajous. *Jour. Frank. Inst.* [**3**], lvii, 55–58.

1869. Plan of the Physical Laboratory of the Mass. Institute of Technology. Pph. 8vo. pp. 16.

1869. A New Form of Spectrum Telescope. *Eng. and Min. Jour.*, July, 1879.

1869. Report on the Total Eclipse of Aug. 7, 1869. *Jour. Frank. Inst.* [**3**], lviii, 281.

1869. Observation of the Corona during the Total Eclipse, Aug. 7, 1869. *Phil. Mag.*, xxxviii, 281.

1869. Note on the supposed Polarization of the Corona. *Jour. Frank. Inst.* [**3**], lviii, 372.

1869. Observations on the Eclipse of Aug. 7, 1869, with an Arago's Polariscope, at Mt. Pleasant, Iowa. *Proc. Am. Asso.*, xviii, 85.

1870. On the Diffraction Produced by the Edges of the Moon. *Jour. Frank. Inst.*, lix, 265.

1870. On Dispersion and the Possibility of Attaining Perfect Achromatism. *Proc. Am. Asso.*, xix, 62–64.

1870. Polarization of the Corona. *Nature*, iii, 82.
1870. Spectrum of the Aurora. *Id.*, iii, 104.
1871. List of Observations of the Polarization of the Corona. *Jour. Frank. Inst.* [**3**], lxi, 58.
1871. Physical Laboratories. *Nature*, iii, 241.
1871. Physical Laboratories. *Am. Chem.*, ii, 213. [Not the same as last title.]
1871. The Graphical Method. *Jour. Frank. Inst.* [**3**], lxi, 272.
1871. Photographing the Corona. *Id.*, lxii, 54.
1871. The Eclipse of 1870. *Old and New*, iii, 634.
1871. Report of Observations of Total Eclipse of the Sun, Dec. 22, 1870. *Rept. U. S. Coast Survey*, 1870, 115, 219.
1871. Report on the Physical Laboratory. *Secretary's Report for* 1871, 7–10.
1871. New Application of Fresnel's Formula of Reflection. *Proc. Am. Acad.*, viii, 331.
1871. On a New Form of Solar Eye Piece. *Id.*, viii, 309.
1872. Report on the Department of Physics. *M. I. T. Prest's Rep.*, 1872, 85–103.
1873. Application of Fresnel's Formula for the Reflection of Light. *Proc. Am. Acad.*, ix., 1–30.
1873. Elements of Physical Manipulation. Part 1. 8vo, pp. 225. New York. (See 1876.)
1873. A Geometrical Solution of some Electrical Problems. *Jour. Frank. Inst.* [**3**], lxvi, 13.
1874. Measurements of the Polarization of the Light Reflected by the Sky, etc. *Am. Jour. Sci.* [**3**], vii, 102–117.
1784. Applications of the Graphical Method. *Proc. Am. Acad.*, ix, 222–227.
1874. Graphical Integration. *Id.*, x, 79–81.
1874. Report on the Department of Physics. *M. I. T. Prest's Rep.*, 1874, 69–73.
1875. (With C. H. Williams, M. D.) Foci of Lenses placed Obliquely. *Proc. Am. Acad.*, x, 300–307.
1875. (With D. P. Strange.) Light Absorbed by the Atmosphere of the Sun. *Id.*, x, 428–432.
1875. (With same.) Tests of a Magneto-Electric Machine. *Id.*, x, 432–435.

1875. Comparison of Prismatic and Diffraction Spectra. *Id.*, xi, 273–278.

1875. Report on the Department of Physics. *M. I. T. Prest's Rep.*, 1875, '76, '77.

1876. Mountain Surveying. *Proc. Am. Acad.*, xi, 256–262.

1876. Height and Velocity of Clouds. *Id.*, xi, 263, 264.

1876. Mt. Liberty. *Appalachia*, i, 122–124.

1876. The Micrometer Level. *Id.*, i, 138–140.

1876. A Nebula Photometer. *Am. Jour. Sci.* [3], xi, 482.

1876. Elements of Physical Manipulation. Part II. 8vo, pp. 316. New York. (See 1873.)

1876. The [illegible] Theory of Color in its Relations to Art and Art Industry. By Dr. [illegible] William von Bezold. Translated from the German by S. R. Koehler. with an Introduction and Notes by Edward C. Pickering. Boston.

1877. The Annual Address of the President [of the Appalachian Mountain Club]. *Appalachia*, i, 63–70. 78.

1877. Progress of the Physical Department of Mass. Institute of Technology, from 1867 to 1877. *M. I. T. Prest's Report*, 1876, 26–39. Also, printed separately for private distribution. Pph. 8vo, pp. 15.

1874–77. Various Physical Notices in *Am. Jour. Sci.* [3], vii, (1874), xiii (1877).

**Pickernell, Frank A.**, S. B., VI. (M. I. T.) 1885.

1885. The Electric Railway in New York. *Science*, vi, 148.

1888. Notes on Telephone Batteries. *Elec. Eng.*, vii, 4[illegible] 82.

1889. A New Era in Telephony. *Elec. World*, Sept. 21, 1889.

1890. Some General Remarks on Telephone Exchange Construction and Equipment. *Elec. Eng.*, x, 310.

**Pike, C. W.**, S. B., VI. (M. I. T.) 1889.

1891. Rules and Formulæ for Incandescent Lamp Wiring. *Elec. Eng.*, xi, 499.

1891. A New Accumulator. Plate. *Jour. Frank. Inst.*, cxxxi, 305.

1891. Notes on Wiring. *Elec. Eng.*, 1891.

1891. A New Form of Storage Battery. *Jour. Frank. Inst.*, cxxxi.

1892. Continuous Shunt Method for the Measurement of Large Continuous Currents. *Id.*, 1892.

1892. Constant Shunt Method for the Measurement of Large Continuous Currents. *Id.*, cxxxi, 476.

1892. Effect of External Magnetic Disturbances on Western Instruments. *Id.*, June, 1892.

**Pike, Wm. A.**, S. B., I. (M. I. T.) 1871.

1893. Paper on Steam Piping. *Engineers' Annual.* Univ. of Minnesota, Minneapolis.

1893. (With T. W. Hugo.) Paper on Street Railway Performance. [Written for Engineers' Congress, Columbian Exposition.] (In press.)

**Porter, E. C.**, Stud. 1876–79.

1887. The South Chicago Works of the North Chicago Rolling Mill Co. [Paper read before the British Iron and Steel Institute, London.]

1893. American Blast Furnace Practice. [Paper in preparation for the Engineering Congress at Chicago.]

1893. Iron and Steel at the World's Columbian Exposition. Series of Articles in *Iron Age*, 1893.

**Porter, Dwight**, Ph. B.; Instr. 1883–1887; Asst. Prof. 1887–90; Assoc. Prof. 1890 —.

1885. The Water Power of the Region Tributary to Long Island Sound. *Tenth Census U. S.*, vol. xvi.

1885. The Water Power of the Hudson River Basin, and Lake George Outlet. *Tenth Census U. S.*, vol. xvi.

1885. The Water Power of the Region Tributary to Lake Ontario, and of the New York State Canals. *Tenth Census U. S.*, vol. xvi.

1885. The Water Power of the Eastern Gulf Slope. *Tenth Census U. S.*, vol. xvi.

1887. The Water Power of the United States. *Proc. Soc. Arts, M. I. T.*, 1886–87, 60.

1888. Removal of Roof Water from Buildings. *Tech. Quar.*, ii, 220.

1889. Report upon a Sanitary Inspection of Certain Tenement House Districts of Boston. Pph. 8vo, pp. 76, with cuts and plans. Boston, 1889.

1891. Flood Discharge from Small Watersheds. *Tech. Quar.*, iv, 316.

1891. Notes on Stereotomy. Prepared for the Use of Students in Mass. Institute of Technology. Paper, 4to, pp. 92. Boston, 1891.

1892. Notes on Warped Surfaces. Prepared for the Use of Civil Engineering Students of Mass. Institute of Technology. Paper, 4to, pp. 47, Boston, 1892.

**Prescott, Charles O.**, S. B., V. (M. I. T.) 1884. Asst. 1884–1886.

1884. (With L. M. Norton.) Continuous Etherification. *Am. Chem. Jour.*, vi, 241.

**Puffer, Wm. L.**, S. B., III. (M. I. T.) 1884. Asst. 1884–1886; Inst. 1886 —.

1888. A Study of Certain Errors in the Constant Shunt Method. *Tech. Quar.*, i, 264.

1890. Data and Parts of Various Incandescent Lamps, together with an Improved Method of Testing. *Elec. Eng.*, ix, 3, 46, 161.

1891. A Pressure Regulator. *Elec. World.*, xvii, 314.

1890. Data and Plots of Incandescent Lamps, together with an Improved Method of Testing, I, II. *Tech. Quar.*, iii, 18, 186.

1891. An Experimental Study of the Waste Field of Dynamos. *Tech. Quar.*, iv, 205.

1893. The Action of Compound Dynamos when Run in Parallel. *Tech. Quar.*, v.

**Purinton, Arthur J.**, S. B., II. (M. I. T.) 1884. Asst. 1884–86; Instr. 1886–1891.

1886. Mechanical Engineering Laboratory of M. I. T. *Proc. Soc. Arts, M. I. T.*, 1886–87, 53.

1887. Steam-Engine Test at the Mass. Institute of Technology. *Tech. Quar.*, i, 211.

**Randall, J. Henry**, Stud. 1882–84.

1892. Colonial Annapolis. *Arch. Record*, i, 3.

**Richards, C. R.**, Stud., 1881–85.

1890. Manual Training in the Public Schools. Series of *Educational Monographs* published by the New York College for the Training of Teachers. No. 13.

1891. Means and Methods of Manual Training. Report of Conference on Manual Training, published by N. E. Conference of Educational Workers. 1891.

**Richards, Ellen H.** (née Swallow), A. M., S. B., V. (M. I. T.) 1873. Instr. 1878—.

1875. Analysis of Samarskite. *Proc. Bost. Soc. Nat. Hist.*, xvii, 424–428.

1875. Occurrence of Boracic Acid in Mineral Waters. *Id.*, xvii, 428–430.

1875. Chemical Composition of some Mineral Species from Newburyport Lead Ore. *Id.*, xvii, 462–465.

1877. (With M. S. Cheney.) A New and Ready Method for the Estimation of Nickel in Pyrrhotites and Mattes. *Am. Jour. Sci.* [**3**], xiv, 178–181.

1878. (With Alice W. Palmer.) Notes on Antimony Tannate. *Am. Jour. Sci.* [**3**], xvi, 196–198, 361–364.

1879. Naphtha Process for Cleaning Wool. *Bull. Nat. Asso. Wool Manufacturers*, ix, No. 2.

1880. On the Adulteration of Groceries. *Rept. Mass. State Bd. of Health, etc.*, i, Supp. (*Dept. of Health*), 55–65.

1882. The Chemistry of Cooking and Cleaning. A Manual for Housekeepers. 12mo, pp. 90. Boston.

1882. First Lessons on Minerals. Pph. 12mo, pp. 32. Boston. Second edition, 1884; pp. 50.

1882. Notes on Some Reactions of Titanium. *Trans. Am. Inst. Min. Eng.*, xi, 90.

1885. Science in Common Schools. *Science*, vi, 289.

1885. Note on the Determination of Carbon Monoxide. *Am. Chem. Jour.*, vii, 143.

1886. Food Materials and their Adulterations. Cloth, 12mo, pp. 179. Boston.

1887. (With Marion Talbot.) Home Sanitation. Cloth, 12mo, pp. 80. Boston.

1888. Food Adulteration and its Detection by J. P. Battershall. A Review. *Tech. Quar.*, i, 282.

1888. Sanitary Science in the Home. *Jour. Frank. Inst.* Reprinted.

1889. Domestic Economy in Public Education. *Educational Monographs* published by the New York College for the Training of Teachers, ii, No. 4.

1890. The Right Application of Heat to the Conversion of Food Material. *Trans. Am. Ass. Adv. Sci.*, Aug. 1890.

1890. (With E. O. Jordan.) Investigations upon Nitrifaction and the Nitrifying Organisms. *Report of Mass. State Board of Health on Water Supply and Sewage.* Pt. II, p. 864.

1890. (With Lottie A. Bragg). The Distribution of Phosphorus and Nitrogen in the Products of Modern Milling. *Tech. Quar.*, ii, 246.

1890. The Relation of College Women to Progress in Domestic Science. *Trans. Collegiate Alumnæ.*

1891. A Delicate Test for Alum in Potable Water. *Tech. Quar.*, iv, 94.

1891. An Apparatus for Determining the Liability of Oils to Spontaneous Combustion. *Tech. Quar.*, iv, 346.

1892. (With Edward Atkinson.) The Science of Nutrition. Sq., 8vo, pp. 179. Springfield Mass., 1892.

1892. An Account of the N. E. Kitchen and Rumford Food Laboratory. — Prepared for the Meeting of the Mass. Medical Society in Boston, June 7 and 8, 1892. pp. 6.

1893. The American Home. Synopsis of a Course of Lectures. Circular, pp. 18. Boston.

**Richards, Robert H.**, S. B., III. (M. I. T.) 1868. Asst. 1868–69; Instr. 1869–70; Asst. Prof. 1870–71; Prof. 1871 —; Secy. of Faculty, 1879–83.

1869. On the Use of Chromate of Barium in Quantitative Analysis. *Am. Jour. Sci.* [**2**], xlviii, 200–202.

1870. Experiments on Bunsen's Filter Pump. *Chem. News*, xxii, 77–79.

1873. The Mining and Metallurgical Laboratories of the Mass. Institute of Technology. *Trans. Am. Inst. Min. Eng.*, i, 400.

1873–74. Report on Mining Laboratories. *M. I. T. Pres't's Rep.*, 1873, 75–83; 1874, 38–45.

1874. A Jet Aspirator for Chemical and Physical Laboratories. *Am. Jour. Sci.* [**3**], viii, 412–428.

1874. On a Newly-Discovered Lead Vein in Newburyport, Mass. *Proc. Bost. Soc. Nat. Hist.*, xvii, 200–204.

1875. Report on the Course of Mining Engineering. *M. I. T. Prest's Rep.*, 1875, 81–93.

1875. The Newburyport Silver Mines. *Trans. Am. Inst. Min. Eng.*, iii., 442–445.

1875. Notes on Assaying. Printed for the Use of Students. Pph. 16mo, pp. 20.

1876. An Improved Form of Aspirator. *Chem. News*, xxxiv, 141.

1877. Jet Pumps for Chemical and Physical Laboratories. *Trans. Am. Inst. Min. Eng.*, vi, 492–498.

1877. A Mining Laboratory. *Id.*, vi, 510–518.

1877. An Edgestone Crusher for Analytical Samples. *Id.*, vi, 518–520.

1880. Notes on Battery and Copper-Plate Amalgamation. *Id.*, viii, 362–370.

1880. Battery and Copper-Plate Amalgamation. *Proc. Soc. Arts, M. I. T.*, 1879–80, 61.

1881. Notes on the Assay Spitzlutte. *Trans. Am. Inst. Min. Eng.*, ix, 318.

1882. Battery and Copper-Plate Amalgamation. *Sci. Am. Supp.*, Aug. 19, 1882.

1883. Changes in the Structure of Block Tin. *Science*, i, 102.

1883. Lines of Weakness in Cylinders. *Id.*, i, 106.

1883. A New Hydraulic Separator. *Trans. Am. Inst. Min. Eng.*, xi, 231.

1884. Economy of Fuel in Iron Manufacture. *Science*, iii, 358.

1884. The Hot Blast in Making Iron. *Id.*, iii, 72, 73.

1887. American Mining Schools. *Trans. Am. Inst. Min. Eng.*, xv, 309 and 809.

1887. (With R. W. Lodge.) The Descent of the Charge in a Blast Furnace. *Id.*, July, 1887. Also *Tech. Quar.*, i, 140.

1888. (With F. W. Clark.) The Summer Schools of Mines. *Proc. Soc. Arts, M. I. T.*, 1888–89, 40.

1889. (With A. E. Woodward.) The Velocity of Bodies of Different Specific Gravity Falling in Water. *Id.*, xvii, 644. Also *Tech. Quar.*, iii, 151.

1890. Development of a System of Amalgamation of Gold Ores. *Tech. Quar.*, iii, 45.

1891. A Hand Telescope for Stadia-Work. *Trans. Am. Inst. Min. Eng.*, xx, 732.

1891. Manual Training as an Inspiration to Mental Development. *Proc. N. E. Conference of Educational Workers.* Also Pph. under title "The Eliot School Course of Manual Training." July, 1892.

1891. One Month's Work on Two Plane-Tables (with Map). *Tech. Quar.*, iv, 122.

1892. A Hand Telescope for Stadia-Work. *Tech. Quar.*, v, 56.

1893. Further Notes on Prismatic Stadia-Telescope. *Trans. Am. Inst. Min. Eng.*, 1893.

1893. A Graphical Slag Calculation. *Trans. Am. Inst. Min. Eng.*, 1893.

1890–93. Lithographic Notes on Ore Dressing. 8vo, pp. 152.

1890–93. Lithographic Notes on Metallurgy of Iron. 8vo, pp. 71.

1890–93. Lithographic Notes on Rock Drills. 8vo, pp. 41.

1890–93. Lithographic Notes on Blowpipe Silver Assay. 8vo, pp. 2.

1890–93. Lithographic Notes on Mining Laboratory. 8vo, pp. 22.

1890–93. Lithographic Notes on Metallurgy of Copper. 8vo, pp. 88.

1890–93. Lithographic Notes on Summer School of Mining. 8vo, pp. 41.

1890–93. (With H. O. Hofman.) Lithographic Notes on Syllabus of Metallurgy. 8vo, pp. 11.

1890–93. (With H. O. Hofman.) Lithographic Notes on Syllabus of Mining. 8vo, pp. 8.

**Richardson, Herbert A.**, S. B., V. (M. I. T.) 1887.

1887. (With L. M. Norton.) Ueber Leinölsäure. *Ber. d. chem. Gesell.*, 20, 2735.

1888. (With L. M. Norton.) On the Fatty Acids of Drying Oils. *Am. Chem. Jour.*, x, 57.

**Ripley, William Z.**, S. B., I. (M. I. T.) 1890, Ph. D.

1892. The Commercial Policy of Europe. *Pol. Sci. Quar.*, Dec. 1892.

1893. Die Getreideterminhandel. Rev. for *Pol. Sci. Quar.*, Mar. 1893. N. Y.

1893. The Financial History of Virginia (1609–1776). Doctor's Dissertation at Columbia College. pp. 150. June.

1890–3. Reviews and Abstracts of leading French and German periodicals. *Jour. of Am. Statistical Ass.* Boston.

**Robbins, Arthur G.**, S. B., I. (M. I. T.) 1886. Asst. 1886–88; Instr. 1888 —.

1887. On the Control of Rivers and the Prevention of Floods. *Tech. Quar.*, i, 1.

1887. The Bussey Bridge. *Id.*, i, 68.

1888. (With J. H. Stanwood.) Gautier's Pocket Telemeter. *Tech. Quar.*, ii, 358.

**Robbins, W. Keltner**, M. S. Asst. 1879–1882.

1881. Report on Examination of Bread. *Rept. Mass. State Bd. of Health, etc.*, ii, Supp. (*Dept. of Health*), p. x.

1881. The Detection of Alum in Bread. *Sci. Observ.*, iii, 42.

1881. An Accident with Hydrofluoric Acid. *Boston Med. and Surg. Jour.*, cv, 401.

**Rockwell, Alfred P.**, A. M. Subst. 1867–68; Prof. 1868–73.

1872. Discovery of the Tusk of an Elephant in Colorado. Note. *Am. Jour. Sci.* [**3**], iii, 373.

**Rogers, William B.**, LL. D. Prof. 1865–71; Prest. 1862–70; 1878–81; Prof. Emeritus 1881–82. Died, 1882.

1860. Objects and Plans of an Institute of Technology. Report of a Committee. Pph. 8vo, pp. 29. 1st edition, Boston, 1860; 2nd edition, 1861.

1863. Electric Illumination at Boston Photometrically Measured. *Am. Jour. Sci.* [**2**], xxxvi.

1864. Scope and Plan of the School of Industrial Science of the Mass. Institute of Technology. Pph. 8vo, pp. 28.

1865. Apparatus and Processes for Chemical and Photometrical Testing of Illuminating Gas. *Rept. Br. Asso. Bath Meeting.*

1874. Geological Map of Virginia on the Basis of Hotchkiss's New Topographical Map. See *Hotchkiss, Summary*, 1874.

1875. On the Newport (R. I.) Conglomerate. *Proc. Bost. Soc. Nat. Hist.*, xviii, 97–181.

1875. On the Gravel and Cobble-Stone Deposits of Virginia and the Middle States. *Proc. Bost. Soc. Nat. Hist.*, xviii, 101–106.

1879. Address on the Scientific Work and the Character of Joseph Henry, delivered in the Hall of Representatives, Washington, D. C. See *A Memorial of Joseph Henry*, printed by order of Congress. 4to, 1880.

1879. Railroad Geology of Virginia and West Virginia. In *Geologists' Travelling Hand-Book*, pp. 179–185.

1880–81. Reports of the President of the National Academy of Sciences. Washington, D. C.

**Rollins, Frank W.**, Stud. 1877–80.

1885. The Ring in the Cliff. Cloth, 12mo. Boston, 1885.

1888. War with Canada. Pph. 8vo. Boston.

1891. The Twin Hussars.

**Rotch, A. Lawrence**, S. B., II. (M. I. T.) 1884.

1883. Fast Trains in Europe and America. *Van Nostrand's Eng. Mag.*, May, 1883.

1887. The Blue Hill Meteorological Observatory. An Account of its Foundation and Work. 8vo, pp. 29 and plates. Boston.

1887. Results of the Meteorological Observations made at the Blue Hill Meteorological Observatory in the Year 1886. 4to, pp. 45 and plates. Boston.

1887. The Mountain Observatories of Europe. Series of Articles in *Am. Met. Jour.*, 1887.

1887. Results of Cloud Measurements at Blue Hill. *Annals of Harvard College Observatory*, xx, pp. 3.

1888. Organization of Meteorological Services in some of the Principal Countries of Europe. Series of Articles. *Am. Met. Jour.*, 1881–9.

1888. Observations of the Solar Eclipse of Aug., 1887. *Id.*, 1888.

1890. On a Meteorological Observatory recently established on Mont Blanc. *Proc. Brit. Assoc. Adv. Sci.*, p. 747. [Leeds Meeting.]

189?. Quelques Resultats des Observations au Mont Blanc. *Mem. Asso. Français pour l'Advancement des Sciences, Session de Limoges*, p. 312.

189?. Sur la Mesure de la Nebulosité pendant la Nuit et de son Enregistrement. *Id.*, 313.

1891. Mountain Meteorology. Extracts from three lectures delivered before Lowell Institute. Pph. Boston. 1891.

1887–1891. Observations made at the Blue Hill Meteorological Observatory. *Annals of Harvard College Observatory*, xx and xxx.

Also Numerous Articles in the *Am. Met. Jour.*

**Runkle, John D.**, Ph. D., LL. D. Prof. 1865 —; Acting Prest. 1868–70; Prest. 1870–78.

1865–84. Moon Culminations. *Am. Ephemeris and Nautical Almanac?*

1872–77. Annual Reports as President. *Publications of the Institute.*

1876. The Russian System of Shop-Work Instruction for Engineers and Machinists. *Publications of the Institute.*

1876. The Manual Element in Education. *Rep. Mass. Board of Education*, xli (1876–77). Also printed separately. Pph. 8vo, pp. 36 and 8 plates.

1881. Technical and Industrial Education Abroad. *Proc. Soc. Arts, M. I. T.*, 1880–81, 83–90.

1882. The Manual Element in Education. From the Forty-fifth Annual Report of the Massachusetts State Board of Education. Pph. 8vo, pp. 72. Boston.

1883. Remarks on the Late President Rogers. *Proc. Soc. Arts, M. I. T.*, 1882–83, 12–23.

1884. Report on Industrial Education. Pph. 16mo, pp. 34. Boston.

1888. Plane Analytic Geometry. 8vo, pp. 344. Boston.

**Russell, Andrew H.**, Stud. 1864–67. Capt. Ord. U. S. A.

1886. Electrical Interrupter for Schultz Chronoscope. *Ordnance Notes, U. S. A.*, No. 46. *Rept. of Chief of Ordnance*, 1878.

1878. Magazine Guns. *Rept. of Chief of Ord.*

1880. Weldon Range Finder, Report on. *Ord. Notes*, 134.

1881. Magazine Guns. *Norton's Fire Arms*, App. A.

1881. Range Finder. Prism with Six Sides. *Ord. Notes*, 162.

1882. Physical Properties of Metals. *Notes on Construction of Ordnance*, No. 15.

1882. Telemeters, or Range Finders. Translation from the French, with Notes by Translator. *Ord. Notes*, 170.

1882. Magazine Guns. *Rept. of Chief of Ord.*

1882. Loading Pan for Breech-Loading Cannon. *Rept. of Getty Board of Heavy Ordnance.*

1886. Hydraulic Buffer with Valved Piston Head for Checking Recoil of Heavy Guns. Priority of Claim to Vavasseur System. *Rept. of Chief of Ord.*

1888. Report on War Department Exhibit at the Cincinnati Exposition of 1888. Pph. 8vo, pp. 99.

1888. Inspecting Mirror for Small Arms. *Rept. of Chief of Ordnance.*

1889. Inspection of Cannon. *Report of Chief of Ordnance.*

1889. The Development of Magazine Guns for Army Use. *Proc. Soc. Arts*, 1888–89, 34.

1890. Casting of Cannon. *Report of Chief of Ordnance.*

1891. Trisection of Angles. New Method. *Nature*, April 9th.

1892. The Construction of Modern Breech-Loading Rifled Morters. *Tech. Quar.*, v, 7.

**Russell, L. Kimball**, S. B., V. (M. I. T.) 1886. Asst. 1892 —.

1888. (With W. R. Nichols.) The Action of Boston Water on Certain Sorts of Service Pipe. *Jour. Asso. Eng. Soc.*, Jan. 9, 1888.

**Ryder, Josiah P.**, S. B., V. (M. I. T.) 1884.

1886. (With A. Michael.) Zur Kenntniss der Einwirkung von Aldehyden auf Phenole. *Ber. d. chem. Gesell.*, xix, 1388.

1887. (With A. Michael.) On the Action of Aldehydes on Phenols. *Am. Chem. Jour.*, ix, 130.

**Safford, Fred H.**, S. B., VI. (M. I. T.) 1888.

1890. (With G. U. G. Holman.) Telephonic Specific Introductive Capacity. *Proc. Am. Acad.*, xxv.

**Sawyer, C. A.**, S. B. Sci. and Lit. (M. I. T.) 1876.

1884. The Johnson System of Heating. Pph.

**Schmidt, Richard E.**, Stud. 1884–6.

1886. Byzantine Ornament. Chicago. *The Inland Architect*, 1886.

**Schwamb, Peter**, S. B., II. (M. I. T.) 1878. Instr. 1883–84; Asst. Prof. 1884, 1888; Asso. Prof. 1888 —.

1885. Notes on the Elements of Mechanism. Prepared for the use of the Students in Mechanical Engineering, Mass. Institute of Technology. Pph. 8vo, pp. 165. Boston.

1888. Notes on Gearing. Prepared for the use of Students in Mechanical Engineering. Mass. Institute of Technology. Pph. 8vo, pp. 74 text, pp. 25 plates.

**Schwarz, Theo. E.**, S. B., III. (M. I. T.) 1876.

1889. The Ore-Deposits of Red Mountain, Ouray Co., Colorado. *Trans. Am. Inst. Min. Eng.*, xviii, 139.

**Sedgwick, William T.**, Ph. D. Asst. Prof. 1883–84; Asso. Prof. 1884–1891. Prof. 1891 —.

1883. Symbiosis and "Vegetating Animals." *Pop. Sci. Monthly*, Oct., 1883, 811–818.

1884. Bacteria and the Germ Theory of Disease. [Review.] *Science*, iii, 133–135.

1885. (With W. R. Nichols.) Report on Illuminating Gas. Mass. State Document, Senate, No. 60, Feb., 1885, pp. 6.

1885. (With W. R. Nichols.) A Study of the Relative Poisonous Effects of Coal and Water Gas. *Sixth Ann. Rept. Mass. State Board of Health, etc.*, Supp., pp. 275–313.

1886. (With E. B. Wilson.) General Biology, 8vo, pp. 193. New York.

1886. Relative Poisonous Properties of Coal and Water Gas. *Proc. Soc. Arts, M. I. T.*, 1885–86, 13.

1886. An Alcoholic Drip for the Thoma-Jung Microtome. *Am. Naturalist*, 1886, pp. 488–490.

1887. Persistent Müllerian Ducts in Male Pickerel Frogs. *Tech. Quar.*, i, 72.

1887. (With S. R. Bartlett.) A Biological Examination of the Water Supply of Newton, Mass. *Proc. Soc. Arts, M. I. T.*, 1887–88, 46.

1887. (With S. R. Bartlett.) A Biological Examination of the Water Supply at Newton, Mass. *Tech. Quar.*, i, 272.

1887. (With G. R. Tucker.) A New Method for the Biological Examination of Air. *Proc. Soc. Arts, M. I. T.*, 1887–88, 51.

1888. Biological Examination of Water. *Tech. Quar.*, ii. 67.

1889. Biological Water Analysis. *Proc. Soc. Arts*, 1888–89, 13.

1890. Filtration, The Data of. *Tech. Quar.*, iii, 69, 338.

1890. Utilization of Surface Water for Drinking Purposes. *Jour. N. E. Water Works Ass.*, v, 39.

1890. Crenothix Kühniana. *Proc. Soc. Arts, M. I. T.*, 1890–91, 13.

1890. A Report of the Biological Work of the Lawrence Experiment Station. *Experimental Investigation by the State Board of Health of Mass. upon Sewage etc.*, pp. 795–864.

1891. Milk Supply and the Public Health. *Tech. Quar.*, iv, 365.

1891. Sanitary Condition of the Water Supply of Lowell, Mass. Lowell, 1891.

1892. The Purification of Drinking Water by Land Filtration. *Jour. N. E. Water Works Ass.*, vii, 103.

1892. Modern Scientific Views of the Cause and Prevention of Asiatic Cholera. *Tech. Quar.*, v, 205.

1892. (With J. L. Batchelder, Jr.) A Bacteriological Examination of the Boston Milk Supply. *Boston Med. Sur. Jour.*, Jan. 1892.

1892. (With Allen Hazen.) Typhoid Fever in Chicago. *Eng. News*, Apr. 21, 1892.

1893. Reflex Action; Biology; Differentiations; Fermentations; Articles in Wood's Reference Hand-Book of Medical Science.

1893. Educational Value of the Methods of Science. *Educational Review*, v, 243.

1893. Ætiology, Epidemiology; Articles on; Supp., *Wood's Hand-Book of the Medical Sciences.* (In Press.)

Also occasional editorial notices upon biological, bacteriological and sanitary subjects, in the *Boston Med. and Surg. Jour.*

**Shed, Nathaniel W.**, S. B., V. (M. I. T.) 1881.

1887. Notes on the Manufacture of Open-Hearth Bridge Steel. *Trans. Am. Inst. Min. Eng.*, xviii, 88.

**Shepard, W. E.**, S. B., VI. (M. I. T.) 1886.

1886. The Inverse Electromotive Force of the Voltaic Arc. *Proc. Am. Acad. Arts and Sciences.* June, 1886.

**Silsbee, Francis H.**, S. B., II. (M. I. T.) 1874.

1874. Cotton Manufacture and the Ring Frame. [Graduating Thesis.] Abstract in *M. I. T. Prest's Rep.*, 1874, 82–84; *Jour. Frank. Inst.* [**3**], lxxi, 89–101, 169–181.

**Skinner, Joseph J.**, Ph. D. Instr. 1885 —.

1887. The Correction Factor of a Galvanometer when the Needle is Displaced along the Axis. *Tech. Quar.*, 1, 59.

1887. A Method of Comparing Galvanometer Coils. *Electrical World*, Sept., 1887.

1887. Mean Plane of a Galvanometer Coil. *Tech. Quar.*, i, 137.

1888. Note on The Candle-Power of the Full Moon. *Elec. Rev.*, June, 1888.

**Smith, Charles A.**, S. B., I. (M. I. T.) 1868. Died, 1884.

1871. Graphical Estimates of Earth Work. *Trans. Engineers' Club of St. Louis*, 1871 —? 8vo, pp. 10.

1878. On the Economic Use of Steam. *Engineering News*, 1878, 369–371, 382–384.

1879. The Slide-Valve and Link Motion. *R. R. Gazette*, 1879, 1–3.

1881. Experiment with a Gas Engine. *Jour. Asso. Eng. Societies*, i, 70–72.

1882. A Theorem of Statics, with some Graphic Applications. *Id.*, i, 217–222.

1882. Experimental Study, Comparing the Influence of Expansion in Simple and Compound Engines. Translated from papers by M. O. Hallauer. *Id.*, i, 298–311, 329–335, 345–349, 386.

1882. Steam Heating. *Id.*, i, 369–380.

1883. Experiments with a Steam Engine. Translated from a Report by M. O. Hallauer. *Id.*, ii, 209–235.

1883. Pumping-Engine Duty. *Proc. Am. W. W. Asso., Third Annual Meeting*, 1883, pp. 52–54.

1883. Steam Using or Modern Boiler Practice. A series of articles in the *Am. Engineer*, beginning Sept. 7, 1883.

1885. Steam Making, or Boiler Practice. [Published, since Professor Smith's death, by *The Am. Engineer*.] 8vo, pp. —. Chicago.

1885. Steam Using or Steam-Engine Practice. 8vo. Chicago.

1886. Permanent Transmitting Dynamometer. *Trans. Am. Soc. Civil Eng.*, 1886, 357.

Also, various papers in *R. R. Gazette Engineering* and *Van Nostrand's Eng. Magazine.*

**Smith, R. H.**, Asst. 1884–85 ; Instr. 1887 — .

1888. Machine Shop Notes. Part I. For the use of Students in the Mass. Institute of Technology. Pph. 8vo, pp. 32. Boston, 1888.

**Snow, Walter B.**, S. B., II. (M. I. T) 1882.

1885. Application of the Indicator to the Steam Fire Engine. *Mech. Engineer*, April 4, 1885.

1885. Classifying Information. *Mech. News*, June 1, 1885.

1885. Draughting-Room Practice. *Mech. Engineer*, serial beginning July 25, 1885.

1887. Boiler-Test Calculations. *Id.*, August 27, 1887.

1887. The Ventilation and Heating of Textile Manufactories. *Textile Record*, 1887, 366.

1891. Preventing Steam in Dye-Houses. *Textile Record*, xii, 45.

1891. Healthful Air in Factory Buildings. *Eng. Mag.*, i, 462.

1891. The Cord Index in the Drafting Room. *Am. Mach.*, Apr. 23, 1891.

1891. The Evolution of a Drafting Room. *Id.*, July 2, 91.

1891. The Ventilation and Heating of Halls of Audience. *Architecture and Building*, serial begun xv, 4.

1891. Mechanical Ventilation. *Mech. News*, Nov. 1, 1891.

1893. The Blower System of Heating and Ventilation. *The Metal Worker*, serial begun Jan 21, 1893.

**Sonnemann, Geo. A.**, S. B., III. (M. I. T.) 1890.

1893. On the Application of Electricity to Mining Operations. Series of articles in *Eng. and Min. Jour.*, lv. New York, 1893.

**Sondericker, Jerome**, S. B., C. E. Instr. 1885–90 ; Asst. Prof. 1890—.

1887. (With G. Lanza.) An Investigation as to How to Test the Strength of Cements. *Trans. Am. Soc. Mech. Eng.*, ix.

1888. An Investigation as to How to Test the Strength of Cements (with discussion). *Jour. Asso. Eng. Soc.*, vii, 207. Also *Tech. Quar.*, i, 178.

1888. Experiments Relating to Theory of Beams. *Tech. Quar.*, ii, 12.

1892. A Description of Some Repeated Stress Experiments. *Tech. Quar.*, v, 70.

**Spaulding, Hollon C.**, S. B., II. (M. I. T.) 1887.

1890. Electric Power-Transmission in Mining Operations. *Trans. Am. Inst. Min. Eng.*, xix, 258.

1890. Electric Power-Transmission in Coal-Mines. *Elec. World*, xvi, 264.

1891. Electricity in Mining Operations. *Eng. Mag.*, i, 363.

1891. Electric Power Distribution. *Cassier's Mag.*, i, 139. Also *Trans. Am. Soc. Mech. Eng.*, xiii, 157.

1891. The Thomson-Houston 100-Horse-Power Freight Locomotive. *Elec. Power*, iii, 457.

1892. Commercial Electricity. *Tech. Quar.*, v, 25.

1893. Variable Speed Power-Transmission. *Cassier's Mag.*, iii, 311.

1893. A Variable Speed Pulley. *Trans. Am. Inst. Min. Eng.*, Vol. xxi.

1893. Spaulding's Catalectric Apparatus. *Elec. Rev.*, Aug. 20, p. 331.

**Stanwood, James B.**, S. B., II. (M. I. T.) 1875.

1874. Report on Experiments in the Institute Steam Laboratory. In Professor Whitaker's Report to the President. *M. I. T. Prest's Rep.*, 174, 116–118.

1875. On Locomotives. [Graduating Thesis.] Abstract in *M. I. T. Prest's Rep.*, 1875, 123, 124.

1879. The Strength of Gear Teeth. Two Papers. *Cincinnati Artisan*, ii, No. 4 (April 1, 1879); No. 5 (May 1, 1879).

1879. The Relation between Pitch and Face of Gear Teeth. *Id.*, iii, No. 6, (June 1, 1879).

1880. Shafting and Belting. Three Papers. *Id.*, iii, No. 3 (March 1, 1880); No. 4 (April 1, 1880); No. 6 (June 1, 1880).

1882. Report of Test on Race Street Flour Mills, Peebles, Fould & Co. *Id.*, iii, No. 7 (July 1, 1880).

1882. Shapes given to Teeth of Cog Wheels. *Sci. Proc. Ohio Mech. Inst.*, i, 9.

1890. Compound and Triple Expansion Steam Engine. *Am. Mach.*, Jan. and Feb.

1890. A Method of Extending the Range of Cut-off and Compression in Corliss Engines. *Id.*, Apr. 10.

1890. Tandem and Twin Engines. *Id.*, July 3.

1890. A Slide-valve Engine. *Id.*, Aug. 21.
1891. Stationary Engine Practice in America. *Engineering*, London, Eng. 11 papers.
1892. A Ready Reference Book for Steam Users. Pph.
1892. Strains in Rims of Fly-band Wheels produced by Centrifugal Force. [Paper. *Am. Soc. Mech. Eng.*, November, 1892].

**Stephens, Samuel G.** Instr. 1883–90.
1885. Notes on Mechanical Engineering, Drawing and the Blue Process. Pph. 8vo, pp. 16. Boston.

**Storer, Frank H.**, S. B., A. M. Prof. 1865–70.
1865. (With C. M. Warren.) Hydrocarbon Naphtha Obtained from Product of Destructive Distillation of Lime Soap. *Mem. Am. Acad.*, **N. S.**, ix (1867), 177.
1865. (With same.) Naphtha from Rangoon Petroleum. *Mem. Am. Acad.*, **N. S.**, ix, 208–216.
1866. Ethics of Adulteration. *Harper's Mag.*, xxxii, 635.
1866. Food of Birds. *Id.*, xxxiii, 241.
1867–68. See Eliot, C. W.
1868. Obituary Notice of Anton Rosing. *Am. Jour. Sci.* [**2**], xlvi, 148, 149.
1868. On the Simultaneous Occurrence of a Soluble Lead Salt and Free Sulphuric Acid in Sherry Wine, etc. *Proc. Am. Acad.*, viii, 59–65.
1869. Review of Johnson's How Crops Grow. *Am. Jour. Sci.* [**2**], xlvii, 147.
1869. (With others.) On Nitric Acid and Chlorate of Potassium as an Oxidizing Mixture, etc. *Am. Jour. Sci.* [**2**], xlviii, 190.
1870. Assay of Galena. *Chem. News*, xxi, 137.
1870. Examples for Practice in Quantitative Analysis. *Chem. News*, xxii, 89, 187.
1870. Cyclopædia of Quantitative Chemical Analysis. Part. 1. Pph. 8vo, pp. 112.

Also many "notes," and one or two articles in the *Nation* during 1865–66.

**Strange, Dalston P.**, M. S. Stud. 1874–75.
1875. (With E. C. Pickering.) Light Absorbed by the Atmosphere of the Sun. *Proc. Am. Acad.*, x, 428–432.

1875. (With same.) Tests of a Magneto-Electric Machine. *Id.*, x, 432–435.

**Sturges, Benton**, S. B., IX. (M. I. T.) 1890.

1890. Dissensions in the American Churches over the Slavery Question; especially as Illustrated in the Presbyterian and Methodist Episcopal Denominations. *Tech. Quar.*, ix, 78.

**Swain, George F.**, S. B., I(M. I. T.) 1877. Inst. 1881–83; Asst. Prof. 1883–86; Asso. Prof. 1886–87; Prof. 1887—.

1877. Design for an Iron Railway Bridge. [Graduating Thesis.] Abstract in *M. I. T. Prest's Rep.*, 1877, 66.

1880. On a General Formula for the Normal Stress in Beams of any Shape. *Van Nostrand's Eng. Mag.*, July, 1880, 63.

1880. On the Stability and Strength of the Stone Arch. *Id.*, Oct, 1880, 265.

1880. Translation of Dr. Winkler's "Pin-Connections for Iron Bridges." *Id.*, Dec., 1880, 459.

1881. Water Power of the Southern Atlantic Slope. Abstract. *Proc. Soc. Arts, M. I. T.*, 1881–82, 62–64.

1882. Water Power of the Southern Atlantic Water Shed of the United States. *U. S. Census Report.* Pph. 4to, pp. 164. Washington, 1881.

1882. Mohr's Graphical Theory of Earth-Pressure. *Jour. Frank. Inst.*, cxiv, 241–251.

1883. On the Application of the Principle of Virtual Velocities to the Determination of the Deflections and Stresses of Frames. *Id.*, cxv, 102–115.

1883. Water Power of the Southern Atlantic Slope. *Proc. Soc. Arts, M. I. T.*, 1882–83.

1885. Water Power of the United States. A General Introduction to Vol. xvi of the Tenth Census.

1885. The Water Power of Eastern New England. *Tenth Census U. S.*, Vol. xvi.

1885. The Water Power of the Middle Atlantic States. *Tenth Census U. S.*, Vol. xvi.

1885. Notes on Hydraulics. Prepared for the use of the Students of the Civil Engineering Department of the Mass. Institute of Technology. Pph. 8vo, pp. 84. Boston.

1886. In Memoriam, William Ripley Nichols. *Proc. N. E. Water Works Asso.* Dec., 1886.

1887. William Ripley Nichols. A Memorial. *Jour. Asso. Eng. Soc.*, vi, 100.

1887. Experimental Comparison of Some Methods of Measuring the Flow of Water. *Proc. Soc. Arts, M. I. T.*, 1886–87, 57.

1887. On the Calculation of the Stresses in Bridges for the Actual Concentrated Loads. *Trans. Am. Soc. C. E.*, 1887, pp. 21–52.

1887. The Influence of Forests upon the Rainfall and upon the Flow of Streams. *Jour. N. E. W. W. Asso.*, March, 1887. Also *Am. Meteorological Journal.* Nov. and Dec., 1888.

1887. (With others.) Report of the Committee of the American Society of Civil Engineers on the Compressive Strength of Cements and the Compression of Mortars and Settlement of Masonry. *Trans. Am. Soc. Civ. Eng.*, 1887, 213.

1888. (With A. E. Burton). The Summer Course in Topography, Geology and Geodesy, Mass. Inst. Tech. *Proc. Soc. Arts, M. I. T.*, 1888–89, 42.

1888. Report on Railroad-Bridges of Massachusetts. [19th Annual Report of Board of Railroad Commissioners.] (1887), p. 39.

1888. Safety Stringers on Wooden Pile and Trestle Bridges. *Railroad Gazette*, Jan. 27, 1888.

1888. The Development of Bridge Building. *Proc. Soc. Arts*, M. I. T., 1887–88, 102.

1888. The Proper Method of Comparing the Cost of Chilled Iron and Steel-Tired Car Wheels. *Tech. Quar.*, i, 409. Also *Railroad Gazette*, 1888, 346.

1888. On the Proper Method of Comparing the Economy of Structures of Different Classes. *Jour. N. E. Water Works Assoc.*, Vol. ii, No. 3.

1888. Statistics of Water-Power employed in Manufacturing in the United States. *Publications Am. Statistical Assoc.*, March, 1888, pp. 1–44.

1889. Report on Bridges in Massachusetts. *20th Ann. Rept. Mass. Railroad Commissioners*, pp. 26.

1889. Report on German Practice as regards the Protection of Grade Crossings and the Arrangement of Railroad Stations. By Prof. A. Goering. Trans. by G. F. Swain. *Id.*, p. 110.

1889. Report on the Accident Due to the Giving Way of a Pile Bridge on the Fitchburg Railroad at Boston, and on Pile Structures in General. *Id.*, p. 211.

1890. Notes on Hydraulics. Prepared for the use of students of Mass. Institute of Technology. New and revised ed. Paper, 8vo, pp. 175. Boston, 1890.

1890. Report on Bridges in Massachusetts. *21st Annual Report Board of Railroad Commissioners*, p. 11.

1890. The Hydraulic Laboratory in the New Engineering Building of the Mass. Institute of Technology. *Proc. Soc. Arts, M. I. T.*, 1889–90, 129. Also *Tech. Quar.*, iii, 203.

1891. Report on Bridges in Massachusetts. *22d Annual Report Board of Railroad Commissioners*, p. 15.

1891. Report on Brakes for Railroad Trains. *Id.*, p. 136.

1891. Report on Fenders for Electric Street Cars. *Id.*, p. 65.

1892. Theory of Structures. Prepared for the use of third year Engineering students of Mass. Institute of Technology. Unbound. 4to, pp. 37. Boston, 1892.

1892. Report of Commission on Electric-Car Fenders to the West End Street Railway Co. of Boston. Paper, 8vo, pp. 16. Boston.

1892. (With others.) Final Report on Same Subject. Paper, 8vo, pp. 14. Boston.

1892. Report on Railroad Bridges in Massachusetts. *23d Report Board of Railroad Commissioners*, p. 13.

1893. Report on Railroad Bridges in Massachusetts. *24th Report Board of Railroad Commissioners*, p. 25.

1893. Report on the Bridge Accident on the Fitchburg Railroad, Feb. 11, 1892. *Id.*, p. 138.

1893. Notes on Theory of Structures. Prepared for use of students in Mass. Inst. of Technology. Lith., 4to, pp. 262. Boston, 1893.

**Taintor, Giles**, S. B., VI. (M. I. T.) 1887.

1887. The President's Train. *Sci. Am. Suppl.*, Oct. 29, 1887.

**Talbot, Marion**, A. M., S. B., IX. (M. I. T.) 1888.

1885. Home Sanitary Inspection. *Christian Union*, xxxi, No. 18, April 30, 1885.

1886. Home Lessons. *The American Teacher*, Jan. and Feb., 1886.

1887. Poetry in Education. *Education*, March, 1887.

1887. A Lenten Bit. *Atlantic Monthly*, April, 1887.

1887. On the Determination of Organic Matter in Air. *Tech. Quar.*, 1, 29.

1887. (With E. H. Richards.) Home Sanitation. Cloth, 12mo, pp. 80. Boston.

**Talbot, Henry P.**, S. B., V. (M. I. T.) 1885. (Ph.D., Leipzig.) Asst. 1885–87; Instr. 1887–92; Asst. Prof. 1892—.

1890. Ueber das Verhalten der Tiglinsäure und der Angelicasäure gegen Bromwasserstoff und der Angelicasäure gegen Bromwasserstoff und Jodwasserstoff. (Inaugural Dissertation.) Leipzig, 1890, 8vo, pp. 49.

1891. Notes on the Action of Hydrobromic and Hydroiodic Acids on Tiglic and Angelic Acids. *Tech. Quar.* iv, 196.

1892. An Index to the Literature of Angelic and Tiglic Acids from 1842 to 1892. *Tech. Quar.*, v, 89.

1892. (With Herbert R. Moody.) On the Properties of Hydrogen Peroxide Solutions. *Tech. Quar.*, v, 123. Also *Jour. Anal. Chem.*, vi, 650.

**Tenney, Frank**, S. B., III. (M. I. T.) 1883.

1883. Experiments on the Estimation of Lead as Lead Dioxide by Means of the Electric Current. *Am. Chem. Jour.*, v, 413.

**Thorp, Frank H.**, S. B., V. (M. I. T.) 1889. Asst. 1889–91.

1890. Experiments on the Preparation of Boiled Linseed Oil. *Tech. Quar.*, iii, 9.

**Tolman, James P.**, S. B., III. (M. I. T.) 1868.

1883. Remarks on the Late President Rogers. *Prot. Soc. Arts, M. I. T.*, 1882–83, 9.

**Trowbridge, John**, S. D. Instr. 1868–69; Asst. Prof. 1869–70.

1870. Annual of Scentific Discovery for 1869. Edited by John Trowbridge, S. D., aided by Samuel Kneeland, M. D., and W. R. Nichols. 12mo, pp. 354.

**Tucker, Benjamin R.**, Stud. 1870–73.

1876. What is Property? or, an Inquiry into the Principle of

Right and of Government. By P. J. Proudhon. Translated and published by Benj. R. Tucker, Princeton, Mass.

1881. Anarchism or Anarchy: A Discussion between Wm. H. Tillinghast and Benj. R. Tucker. Boston.

1882. God and the State. By Michael Bakounine. Translated and published by Benj. R. Tucker. Boston.

1886. What's To Be Done? By N. G. Tchernychewsky. Translated and published by Benj. R. Tucker. Boston.

1888. System of Economical Contradictions; or, The Philosophy of Misery. Vol. I. By P. J. Proudhon. Translated and published by Benj. R. Tucker. Boston.

1890. The Kreutzer Sonata. By Leo Tolstoi. Translated and published by Benj. R. Tucker. Boston.

1890. The Rag-Picker of Paris. By Félix Pyat. Translated and published by Benj. R. Tucker. Boston.

1890. My Uncle Benjamin. By Claude Tillier. Translated and published by Benj. R. Tucker. 12mo, Boston, 1890.

1891. Money. By Emile Zola. Translated and published by Benj. R. Tucker. Boston.

1893. Modern Marriage. By Emile Zola. Translated and published by Benj. R. Tucker. New York.

1893. Instead of a Book: By a Man Too Busy to Write One. A Fragmentary Exposition of Philosophical Anarchism. Culled from the writings of Benj. R. Tucker. New York.

1875—. *Word*, Princeton, Mass., Associate Editor from April, 1875, to Dec., 1876. *Radical Review*, New Bedford, Mass., editor and publisher from Jan., 1877, to Feb., 1878. *Globe*, Boston, Mass., editorial staff in various capacities from Sept., 1878, to Nov., 1889. *Liberty*, Boston, Mass., editor and publisher from Aug., 1881, to Jan., 1892. *Proudhon Library*, Boston, Mass., editor and publisher from Jan., 1887, to Jan., 1888. *The Transatlantic*, Boston, Mass., editor from Oct., 1889, to May, 1890. *Engineering Magazine*, New York, editorial staff from Feb., 1892, to present time. *Liberty*, New York, editor and publisher from April, 1893, to present time. Numerous contributions to each.

**Tucker, Greenleaf R.**, S. B., V. (M. I. T.) 1887.

1887. (With W. T. Sedgwick.) A New Method for the Biolog-

ical Examination of Air. *Proc. Soc. Arts, M. I. T.*, 1887–88, 51.

1888. On the Number and Distribution of the Micro-Organisms in the Air of Boston City Hospital. *Rept. Mass. State Board of Health*, 1888, 161.

1889. (With Dr. H. L. Burrell). Some Practical Experiments in the Details of Aseptic Surgery. *Proc. Mass. Med. Soc.*, 1889.

**Tryon, Thomas,** Stud. 1879–81.

1887. (With A. W. Brunner.) Interior Decoration. New York.

**Tyler, Harry W.**, S. B., V. (M.I.T.) 1884. Ph. B. [Ph. D. Erlangen.] Asst. 1884–86; Instr. 1886–90; Asst. Prof. 1890–92; Assoc. Prof. 1892—. Sec. 1889.

1886. Entertainments in Chemistry. 16mo, pp. 79.

1890. The Application of Determinant Theorems to a Particular Case. *Tech. Quar.*, iii, 321.

1891. Beziehungen zwischen der Sylvester'schen und der Bézont'schen Determinante. 8vo, pp. 96. Munich. [Reprinted as Inaugural Dissertation from the *Sitzungsberichte der physikal-medizin. Societät.*]

1891. Technological Education in the United States. *Forum*, Sept.

**Underwood, George R.**, S. B., V. (M. I. T.) 1883. Asst. 1883–86; Instr. 1886–88.

1883. (With W. S. Allen.) Sur un produit de l'oxydation de la diethylbenzine. *Bull. Soc. Chem.*, xl, 100.

**Van Daell, Alphonse N.**, LL. D. Prof. 1889—.

1889. Pages Choisies des Mémoires du Duc de Saint Simon. 12mo, pp. 236. Boston, 1889.

1890. The Study of Foreign Languages in Technological Schools. *Tech. Quar.*, iii, 317.

1891. Beaumarchais and the Lost Million. *Tech. Quar.*, iv, 349.

1891. The Value of the Study of Modern Languages to a Student of Science. *Proc. Soc. Arts, M. I. T.*, 1890–91, 140.

1892. La Cigale chez les Fourmis. 12mo. pp. 75. Boston, 1892.

1893. An Introduction to the French Language, being a practical and theoretical grammar for the use of Schools and Colleges. 12mo, pp. 225. Boston, 1893.

**Vanier, Geo. H.**, S. B., III. (M. I. T.) 1885.

1888. Measuring Apparatus. *Jour. Anal. Chem.*, ii, 144.

1890. Pipette for Hydrofluoric Acid. *Id.*, iv, 48.

**Very, Frank W.**, S. B., V. (M. I. T.) 1873.

1872. To Find the Refractive Formula of any Substance. Abstract. *M. I. T. Prest's Rep.*, 1872, 99.

1873. A Few Instances Showing the Possibility of Applying the Microscope to Inorganic Qualitative Analysis. [Graduating Thesis.] *Jour. Frank. Inst.* [3], lxxi, 135–141. 2 plates.

1883. An Interesting Sun Spot. *Science*, ii, 266.

1889. (With S. P. Langley.) The Temperature of the Moon. *Memoirs Nat. Acad. Sci.*, iv, part ii, 107–212. 26 plates.

1890. (With S. P. Langley.) On the Cheapest Form of Light. *Am. Jour. Sci.* [3], xl, 97.

1891. Prize Essay on the Distribution of the Moon's Heat and its Variation with the Phase. Published by the *Utrecht Soc. of Arts and Sci.* pp. 45. pl. 11, $7\frac{3}{4}$ x 11 in. The Hague, 1891.

1891. The Terminal Moraine of the Continental Ice-Sheet and the Ice-Age. *Trans. Acad. Sci. and Art of Pittsburgh.* Reprinted. Pph. pp. 22. $5\frac{3}{4}$ x 9 in.

Also various Philosophical and Psychological Articles in the *New Christianity.*

**Vose, George L.**, A. M., C. E. Prof. 1881–85.

1882. Inspection of Public Works. *Proc. Soc. Arts, M. I. T.*, 1881–82, 36–47.

1882. Bridge Disasters in America: The Cause and Remedy. Pph. 8vo. New York.

1882. Safety in Railway Travel. *North American Review*, Sept., 1882.

1882. The Training for Students in Civil Engineering. *Jour. Asso. Eng. Societies*, i, 1–14.

1883. Railway Accidents in 1882. *Science*, i, 167.

1883. Inspection of Public Works. *Van Nostrand's Eng. Mag.*, Sept., 1883, 204–210.

1884. Notes Relating to the Early History of Transportation in Massachusetts. *Jour. Asso. Eng. Societies*, iv, 53–72.

1885. A Sketch of the Life and Works of Loammi Baldwin, Civil Engineer. *Jour. Asso. Eng. Societies*, v, 10–25. Also, pph, 8vo, pp. 28. Boston.

**Waitt, Arthur M.**, S. B., II. (M. I. T.) 1879.

1892. Master Car Builders' Standards. *Locomotive Engineering*, Jan., 1892.

1892. Car Heating by Steam. *Proc. Western Ry. Club*, Sept., 1892.

1893. The M. C. B. Type of Car Coupler. *The Railway Age*, May, 1893.

**Wakeman, Alfred J.**, S. B. Asst. 1887–88.

1887. On the Solubility of Magnesium Ammonium Phosphate in Alcohol. *Tech. Quar.*, i, 173.

**Walker, Francis A.**, Ph. D., LL. D. President, 1882—.

1882. American Agriculture. *Princeton Review*, May, 1882.

1882. The Growth of the United States. *The Century*, Oct., 1882.

1882. Remarks on the Character of President W. B. Rogers. *Proc. Soc. Arts*, i. Also printed separately.

1883. American Manufactures. *Princeton Review*, March, 1883.

1883. Political Economy. [Vol. V. of the American Science Series.] 8vo, pp. 495. New York and London.

1883. Henry George's Social Fallacies. *North American Review*, Aug., 1883.

1883. Land and its Rent. 16mo, pp. 232. Boston and London.

1883. Report as President M. I. T., Dec. 12, 1883. Pph. 8vo, pp. 31.

1884. The Second and Third Army Corps. *The Nation*, March 27, 1884.

1884. Political Economy. [American Science Series, Briefer Course.] Abridged from work of 1883. 12mo, pp. 419. New York.

1884. Industrial Education, read before the American Social Science Association, Sept. 9, 1884. Pph. 8vo, pp. 16 [*Society's Journal*, 1884. Part 1, pp. 117–131].

1884. Report as President, M. I. T., Dec. 10, 1884. Pph. 8vo, pp. 20.

1884. Laloe's Encyclopedia of Political Science. Articles on "Wages," "Wage Fund," "Public Revenue." v, iii, 68, 1074.

1885. Johnson's Cyclopedia. 2d edition. "Census."

1885. (With Professors W. G. Sumner and J. L. Laughlin.) Shall Silver be Demonetized? *North Am. Review*, June, 1885.

1885. Report as President M. I. T., Dec. 9, 1885. Pph. 8vo, pp. 24.

1886. Introduction to New England Edition of Maury's Geography.

1886. What Industry, if Any, can profitably be introduced into Country Schools? *Science*, ix, 365.

1886. History of the Second Army Corps, in the Army of the Potomac. 8vo, pp. 571. New York.

1886. Report as President, M. I. T., Dec. 8, 1886. Pph. 8vo, pp. 32.

1887. Socialism. *Scribner's Magazine*, Jan., 1887.

1887. Gen. Hancock and the Artillery at Gettysburg. *The Century*, March, 1887.

1887. The Source of Business Profits. *Quarterly Journal of Economics*, April, 1887. [Also, in *Proceedings of Society of Arts*, 1886–87.]

1887. The Socialists. *The Forum*, May, 1887.

1887. A Plea for Industrial Education in the Public Schools. Pph. 12mo, pp. 34. Boston.

1887. Arithmetic in Primary and Grammar Schools. Pph. 12mo, pp. 29. Boston.

1887. Report as President M. I. T. Dec., 1887. Pph. 8vo, pp. 39.

1887. Meade at Gettysburg. *Century War Book.*

1887. Industrial Education in Cities and Large Towns. [Address given at Chicago, May, 1887.] *Trans. Nat. Teachers Asso.*, p. 196.

1887. The Labor Problem of To-day. [Address at Commencement at Lehigh University, June 22, 1887.] Printed for Alumni. N. Y., pp. 29.

1887. Efforts of the Manual Laboring Class to Better their Condition. [Address as Pres. Am. Economic Asso. Boston, May 21, 1887.] *Proc. Am. Econ. Asso.*, iii, no. 3, p. 3.

1887. Memoir of William Barton Rogers, 1804–82. [Read before the National Academy, April, 1887.] Pph. 8vo, pp. 13. Washington. Also *Memoirs of Nat. Acad.*, 1887.

1887. Remarks on Opening of Exhibition of Mass. Charitable Mechanic Association, Sept., 1887. *Trans. Mass. Char. Mech. Asso.*, 1887, p. 56.

1887. Arithmetic in the Boston Schools. [Read before Mass. State Teachers Asso., Nov. 25, 1887.] *Academy*, Syracuse, Jan., 1888, p. 433. Separately reprinted.

1887. Sketch of the Life of Amasa Walker, in History of North Brookfield, Mass., 1887. The same expanded in *N. E. Hist. Genealogical Register*, April, 1888, p. 133. Separately printed.

1887. Reply to Mr. Ellis Peterson on the Study of Arithmetic in Grammar Schools. *Popular Educator*, Sept., 1887, pp. 209–11.

1887. Lord Wolseley on Gen. Lee. *The Nation*, xliv, 269, 362–3.

1887. What Shall We Tell the Working Classes? *Scribner's Magazine*, Nov., 1887.

1887. The United States: Population and Industry. *British Encyclopedia.* 9th ed., vol. xxii, p. 818–.

1881–87. Census Reports. 22 4to volumes and 2 8vo volumes.

1888. On the Economy of Food. *Science*, xi, p. 233.

1888. The Knights of Labor. *Princeton Review*, Sept., 1888, p. 196.

1888. Recent Progress of Political Economy in the United States. [Address as Pres. of the American Economic Association. Philadelphia, Dec. 27, 1888.] *Proc. Am. Econ. Asso.*, iv, No. 4. p. 17.

1888. A Reply to Mr. Macvane on the Source of Business Profits. *Quar. Journal Economics*, April, 1888.

1888. Report as President M. I. T., Dec. 1888. Pph. 8vo, pp. 50.

1888. Philip Henry Sheridan. [Eulogy delivered before the City Gov't of Boston, Dec. 18, 1888.] Printed in *Sheridan Memorial*, p. 41.

1888. The Eleventh Census of the United States. *Quar. Jour. Econ.*, Jan., 1888, p. 135.

1888. The Bases of Taxation. *Pol. Sci. Quar.*, Mar., 1888, p. 1.

1889. Can Morality be Taught in the Schools without Sectarianism? *Christian Register*, Jan. 31, 1889.

1889. The Laborer and his Employer. [Lecture delivered in Libby College, Cornell University, Feb. 9, 1889.] *Sci. Amer.*, June 1, 1889.

1889. Indian Schools. Letter to *Southern Workman* quoted in *Proc. 7th Annual Meeting Lake Mohawk Conference*, p. 36.

1889. The Nation That was Saved. [Oration at Reunion of N. H. Soldiers, Weirs, Aug. 29, 1889.] *Veteran's Advocate.*

1889. Civil Service Reform. [Thanksgiving Day Discourse.] *N. Y. Independent*, Nov. 28, 1889.

1889. First Lessons in Political Economy. 12mo, pp., viii + 323. New York and London. 1889.

1889. Report as President M. I. T., Dec., 1889. Pph. 8vo, pp. 61.

1890. Mr. Bellamy and the New Nationalist Party. *Atlantic Monthly*, Jan., 1890, p. 248. Printed separately.

1890. America's Fourth Centenary. *The Forum*, Feb., 1890, p. 612.

1890. Protection and Protectionists. *Quar. Jour. Econ.*, April, 1890, p. 245.

1890. The Eight-Hour Law Agitation. *Atlantic Monthly*, June, 1890, p. 300.

1890. The Great Review. [Address before the Society of the Army of the Potomac. Portland, Maine, July 3, 1890.] *Proc. Soc. Army of Potomac*, 1890.

1890. Democracy and Wealth. *The Forum*, Nov., 1890, p. 243.

1890. Statistics of the Colored Race in the U. S. *Trans. Am. State Ass.*, 1890, p. 91.

1890. The Study of Statistics in Colleges and Technical Schools. *Tech. Quar.*, iii, i.

1890. Address on Presentations of Diplomas. *Tech. Quar.* iii, 202.

1890. Changes of the Year. *Tech. Quar.*

1890. The Tide of Economic Thought. [Address as Pres. of Am. Econ. Asso., Washington, Dec. 26, 1890.] *Trans. Am. Econ. Asso.*, vi, Nos. 1 and 2, p. 15. Separate copies.

1890. Report as President M. I. T., Dec., 1890. Pph. 8vo, pp.67.

1891. The Free Coinage of Silver. Evidence before the Committee on Coinage. U. S. H. R., Jan. 29, 1891. *Reports and Hearings*, 548.

1891. Charles Devens. [Oration before the Mass. Commandery of the Loyal Legion, Mar. 19, 1891.] Also pph. 8vo, pp. 20.

1891. The United States Census. *The Forum*, May, 1891, p. 258.

1891. The Great Count of 1890. *The Forum*, June, 1891, p. 406.

1891. The Census of the Colored Race. *The Forum*, July, 1891, p. 501.

1891. The Doctrine of Real and the Residual Claimant. Theory of Wages. *Quar. Jour. Econ.*, July, 1891, p. 417.

1891. Immigration and Degradation. *The Forum*, Aug. 3, 1891, p. 634.

1891. Report as the President M. I. T., Dec., 1891. Pph. 8vo, pp. 70.

1891. Hancock in the War of the Rebellion. [Paper read before the N. Y. Commandery Loyal Legion, Feb. 4, 1891.] Pph. 8vo, pp. 16.

1891. The Place of Scientific and Technological Schools in the American System of Education. [An Address delivered before the Convocation of the State of N. Y., Albany, June 1, 1891.] *Tech. Quar.*, iv, 293.

1892. Growth and Distribution of Population in the U. S. *The Chautauquan*, Feb. 9, 1892.

1892. Dr. Boehm Bawerk's Theory of Interest. *Quar. Jour. of Econ.*, July, 1892.

1892. Immigration. *Yale Review*, Aug., 1892.

1892. Normal Training in Woman's Colleges. *Edu. Rev.*, Nov., 1892, p. 328.

1892. Report as President M. I. T., Dec., 1892. Pph. 8vo, pp. 81.

1893. Letter to Editor Engineering News. *Eng. News.*, Jan. 26, p. 90: Feb. 2, p. 108. 1893.

**Wallberg, E. A.** Stud. 1891–92.

1890. Managing Editor of the *Transit*, Iowa City, Iowa.

1890. The Preservation of Timber. *Transit.*

1891. Secondary Strains. *Transit.*

**Ward, Clarence S.**, S. B., III. (M. I. T.) 1872, LL. B. Instr. 1872–74.

1872. (With B. E. Brewster.) Report of Experiments on a Queenpost Truss. *M. I. T. Prest's Rep.*, 1872, 86–88.

1873. Experiments upon the Decomposition of Sulphide of Arsenic by Water. *Am. Chem.*, iv, 10.

1887. Wit, Wisdom and Beauties of Shakespeare. 16mo. Boston, 1887.

**Ware, Robert C.**, S. B., IX. (M. I. T.) 1874 and 1876. Died, 1883.

1874. France. [Graduating Thesis in Science and Literature.] Abstract in *M. I. T. Prest's Rept.*, 1874.

1876. Historical and Logical Relations between Fichte and Kant. [Graduating Thesis in Philosophy.] *Jour. Spec. Philos.*, xi, 145–152.

**Ware, William R.**, S. B. Prof. 1865–81.

1866. An Outline of a Course of Architectural Instruction. [Printed for private distribution.] Pph. 8vo, pp. 26.

1870–79. Reports of the Committee on Education and the Committee on Professional Practice of the American Institute of Architects. *Publications of the Institute.*

1871. Application of Mr. Hare's System of Voting to the Nomination of Overseers of Harvard College, March 1, 1871. *Proc. Am. Soc. Sci. Asso.*, iii, 192–198.

1872–76. Reports of Department of Architecture. *M. I. T. Prest's Rep.*, 1872, 35–50; 1873, 84, 85; 1874, 16, 17; 1875, 145–158; 1876, 168–170.

1874. On Proportional Representation. *Am. Law Review*, Jan., 1874. Also, pph. 8vo. London, 1874.

1875. Charcoal Drawing. A Lecture delivered at the Mass. Normal Art School. Pph. 8vo, pp. 19 and 3 plates. Boston.

1875. Examples of Building Construction. 48 plates, with accompanying Instructions to Teachers. Boston.

1875. Parallel of Historical Ornament. 10 plates, plain and colored. Boston.

1878–81. Annual Reports (five) of the School of Drawing and Painting at the Museum of Fine Arts, Boston.

1878. Papers on Perspective. *Am. Architect and Building News*, Jan.–Aug., 1878.

1878. Greek Ornament. 12 colored plates, with selected text.

1881. Address delivered before the Graduating Class of the Worcester County Free Institute, June, 1881. Pph. 8vo, pp. 9, Worcester.

1888–92. Equestrian Monuments. Series of fifty papers, with over five hundred illustrations, in *The American Architect* and *Building News*.

**Warren, Cyrus M.**, S. B. Prof. 1866–68.

1866. On a New Process of Organic Elementary Analysis for Substances containing Chlorine. *Proc. Am. Acad.*, vii, 84–96.

1866. Note on an Improved Apparatus for the Determination of Vapor Densities by Gay Lussac's Method. *Id.*, vii, 99, 100.

1868. Hydrocarbons of the Pennsylvania Petroleum. *Am. Jour. Sci.* [**2**], xlv, 262–264.

**Warren, Edward S.**, S. B., VII. (M. I. T.) 1881.

1887. Snow-Shoeing in the Rocky Mountains. *Outing*, ix, No. 4, Jan., 1887.

**Warren, Herbert Langford.** Stud. 1879.

1892. Notes on Wenlock Priory. Illustrated. Published in the *Architectural Review*, Vol i, Nos. 1 and 6.

1892. Review of Blomfield's "The Formal Garden in England" in *Architectural Review*, Vol. i, No. 6.

1892. Some Neglected Considerations with Regard to Brick Design. *The Brickbuilder*, Jan. Boston.

1893. Review of Mrs. Van Rensselaer's "English Cathedrals" in *Architectural Review*.

**Warren, S. Edward**, C. E. Prof. 1872–75.

1873. Report of Department of Descriptive Geometry, etc. *M. I. T. Prest's Rep.*, 1873, 20–26.

1873. Free-Hand Geometrical Drawing. 12mo, pp. 60, 6 plates. New York.

1874. Elements of Descriptive Geometry. 8vo, pp. 252, 24 plates. New York.

1874. Descriptive Geometry Models. *Jour. Frank. Inst.* [**3**], lxvii, 45–47. Also, *M. I. T. Prest's Rep.*, 1875, 44–48.

1875. Problems in Stone Cutting. 8vo, pp. 126; 10 plates. New York.

**Waterman, Richard, Jr.**, S. B., IX. (M. I. T.) 1892.

1892. Educational Exhibits at the World's Fairs since 1851. *Educational Review*, Feb., Mar., 1892.

**Watson, William**, Ph. D. Prof. 1865–73.

1866. On Formulæ of Reduction. *Messenger of Math.*, iii, 54.

1871. Report on Museum of Descriptive Geometry and Machinery. *Secy's Report*, 1871, 10–16.

1872. Report on Department. *M. I. T., Prest's Rep.*, 1872, 51–77.

1872. Papers on Technical Education read before the Society of Arts of the Mass. Institute of Technology, 1863–72. [Printed for private distribution.] Pph. 8vo, pp. 55. Boston.

**Wells, Webster**, S. B., I. (M. I. T.) 1873. Instr. 1873–80; 1882–83; Asst. Prof. 1883–85; Asso. Prof. 1885—.

1878. Logarithms. 12mo, pp. 40. Boston.

1878. University Algebra. 8vo, pp. 469. Boston.

1879. A Three-Days' Trip over the Hancock-Carrigain Range. *Appalachia*, ii, 164–166.

1879. Paths to Black Mountain and Mt. Tecumseh. *Id.*, ii, 174.

1884. Plane and Spherical Trigonometry. 12mo, pp. 220. Boston and New York. (Published in two forms, with and without Six-Place Logarithmic Tables.)

1885. Academic Algebra. 12mo, pp. 357. Boston and New York. (Published in two forms, with and without answers.)

1887. Plane and Solid Geometry. 12mo, pp. 379. Boston and New York.

(The two parts also published separately under the titles "Well's Plane Geometry," and "Well's Solid Geometry.")

1887. Key to Wells' Academic Algebra. 12mo, pp. 431. Boston and New York.

1887. Key to Wells' Plane and Solid Geometry. 12mo, pp. 130. Boston and New York.

1887. The Essentials of Trigonometry. 12mo, pp. 157. Boston and New York.

(Published in two forms, with and without Four-Place Tables; also, the first part published separately under the title "Wells' Plane Trigonometry.")

1887. Four-Place Tables. 12mo, pp. 26. Boston and New York.

1888. Key to Wells' Essentials of Trigonometry. 12mo, pp. 97. Boston and New York.

1888. Plane Geometry, in raised type for the use of the blind. 2 vols., 188 pp. Louisville.

1889. Higher Algebra. 12mo, pp. ix+376+50. Boston and New York.

1890. Key to Wells' Higher Algebra. 12mo, pp. 491. Boston and New York.

1890. College Algebra. 12mo, pp. 583. Boston and New York. (That portion of the work following Chapter XVIII. published separately.)

1891. Six-Place Logarithmic Tables. pp. 91. Boston and New York.

1893. Academic Arithmetic. 12mo, pp. 341. Boston and New York.

(Published in two forms, with and without answers.)

**Wendell, G. V.**, S. B., VIII. (M. I. T.) 1892. Asst. 1892. — Instr. 1893—.

1893. (With C. R. Cross.) On Some Experiments with the Phonograph, relating to the Vowel Theory of Helmholtz. *Proc. Am. Acad.*, 1893, 271.

**Wesson, David**, S. B., V. (M. I. T.) 1883.

1885. Laundry Soaps and their Adulteration. *Am. Analyst*, i, 89.

1889. Notes on Bechi Test for Cotton Seed Oil in Lard. *Jour. Anal. Chem.*, iii, 361.

**Weston, J. F.** Stud. 1881–84.

1885. Paper upon Laundry Soap. Pph. pp. 11, 12mo. Prescott, A. T.

**White, Anthony C.**, S. B., VIII. (M. I. T.) 1882.

1884. The Silent Electric Arc. *London Elec.*, Nov., 1884.

1885. Effect of Atmospheric Electricity upon the Spinning of Cotton. From *Proc. N. E. Cotton Mfrs. Asso.* (with discussion.) Pph. 8vo, pp. 9. Boston.

1886. Comparison of Alcohol Thermometers Baudin 8208 and 8209 with the Air Thermometer at Low Temperatures. *Proc. Am. Acad.*, xxi, 45.

1886. Changes in the Resistance Cold of the Carbon Filaments of Incandescent Lamps. *Electrician and Electrical Eng.*, Jan., 1886.

1890. Combination Voltmeter and Ammeter for Electrical Measurements. *Proc. Soc. Arts, M. I. T.*, 1879–90, 60.

**White, Franklin W.**, S. B., VII. (M. I. T.) 1890.

1890. (With Allen Hazen.) On an Application of Agar Plate Cultures to Water Analysis, with special Reference to the Detection of the Bacillus of Typhoid. *Boston Med. Sur. Jour.*, v, 124.

**Whiting, Jasper**, S. B., III. (M. I. T.) 1889.

1891. Some Experiments on Blast-Furnace Gases. *Trans. Am. Inst. Min. Eng.*, xx, 280.

**Whitney, Asa W.** Stud. 1880–82.

1889. Article in Answer to Query No. 5 of No. 3, Vol. 8. *Jour. U. S. Ass. Charcoal Iron Workers*, Mar. 23, 1889.

**Whittlesey, Walter.** Stud. 1866–70.

1870. See Wilbur, Chas. A.

**Wilbur, Charles A.** Stud. 1866–70.

1870. (With W. Whittlesey.) On the Estimation of Ferrous Oxide in Presence of Ferric Oxide in Silicious Minerals. *Am. Chem.*, i, 97.

**Williams, A. S.**, S. B., VI. (M. I. T.) 1888.

1889. (With C. R. Cross). The Strength of the Induced Current with a Magneto-Telephone Transmitter as influenced by the Strength of the Magnet. *Proc. Am. Acad.* xxiv, 113. Also *Tech. Quar.*, ii, 265.

**Williams, Charles H.**, M. D. Stud. 1874–75.

1875. (With E. C. Pickering.) Foci of Lenses placed Obliquely. *Proc. Am. Acad.*, x, 300–307.

1875. Intensity of Twilight. *Id.*, x, 421–425.

1884. An Alloplastic Operation. *Boston Med. and Surg. Jour.*, Aug. 14, 1884.

1884. Ocular Anæsthesia produced by Cocaine. *Id.*, Nov. 6, 1884.

1885. The Use and Care of the Eyes, especially During School Years. *Lectures on School Hygiene.* Boston, 1885.

1887. Comparison of some Cases of Cataract Extraction. *Boston Med. and Surg. Jour.*, Sept. 1, 1887.

**Williams, Francis H.**, S. B., V. (M. I. T.) 1873, M. D.

1873. On the Synthesis of Hydrocarbons by the Treatment of Cast Iron with Acids. *Am. Jour. Sci.* [**3**], vi, 363–368.

1880. Ueber die Ursache der Blutdrucksteigerung bei der Digitalenwirkung. *Archiv. fur exp. Patholgie u. Pharmak.*, xiii, 1.

1880. (With H. Meyer.) Ueber acute Eisenwirkung. *Id*, xiii, 70.

1881. New Evacuator for the Bladder. *Bost. Med. and Surg. Jour.*, civ, 420.

1881. A Method for Evacuating and Irrigating the Bladder and other Parts. *Id.*, civ, 610–612.

1882. A Study of the Action of Iron. *Id.*, Aug. 3, 1882.

1883. Reports on progress in therapeutics in the *Bost. Med. and Surg. Jour.*

1885. A Text-Book of Pharmacology, Therapeutics, and Materia Medica. By T. Lander Brunton, M. D., etc. Adapted to the U. S. Pharmacopœia, by Francis H. Williams, M. D., Boston. 8vo, pp. 1035. Philadelphia.

1888–89. Monthly reports in editing the department of therapeutics in *Am. Jour. Med. Sci.*

1889. Two Cases of Chylous Urine. *Med. and Surg. Reports of Boston City Hospital*, 1889.

1891. Nourishment in Acute Diseases. *Proc. Mass. Med. Soc.*, June, 1891.

1892. Strong Hydrogen Peroxide Solutions, locally in Diphtheria. *Boston Med. and Surg. Jour.*, Sept. 22, 1892.

1893. The Intermittent Adminstration of Quinine in Malaria, with the Temperature as a Guide. *Bost. Med. and Surg. Jour.*, March 9, 1893.

**Williams, Henry J.**, A. B. Stud. 1884–85.

1887. (With L. M. Norton.) On the Action of Bromine on Isobutylene. *Am. Chem. Jour.*, ix, 87.

1888. The Determination of Silicon in Ferro-Silicon, etc. *Trans. Am. Inst. Min. Eng.*, xvii, 542.

1892–3. The Chemistry of Rubber Ingredients. Series of Articles in *India Rubber World.*

**Williston, Arthur L.**, S. B., II. (M. I. T.) 1889. Inst. 1891–92.

1890. (With C. H. Peabody.) Experiments on the Errors of Different Types of Calorimeters. *Tech. Quar.*, iii, 37. Also *Trans. Am. Soc. Mech. Eng.*, xi, '93.

**Wilson, B. F. Jr.** Stud. 1885–89.

1890. Use of the Bichloride of Mercury in the Saving of Fine Gold. *Eng. and Min. Jour.*, Jan. 11, 1890.

**Wing, Charles H.**, S. B. Substitute 1874–75; Prof. 1875–84.

1875. Report of the Department of Chemistry. *M. I. T. Prest's Rep.*, 1875, 75–80.

**Winslow, Arthur**, S. B., III. (M. I. T.) 1881.

1884. Peculiarities of Weathering in the Pottsville Conglomerate. *Science*, Jan. 4, 1884.

1884. Theory of Stadia Measurements, accompanied by Tables of Horizontal Distances and Differences of Level. *Rept. A. A. 2d Geol. Survey of Pa.*

1885. Method for Estimating Contents of Highly Plicated Coal Beds. *Rept. A. A. 2d Geol. Survey of Pa.*

1885. Color and other Associations. *Science*, vi, 243.

1885. Report on Pyrites in North Carolina. *Rept. N. C. Ag. Experimental Station*, 1885, 93.

1885. North Carolina Agriculture. *Bradstreet's*, Sept. 5, 1885.

1885. North Carolina Mining Notes. *Eng. and Min. Jour.*, 1885.

1885. Tin Ore in Virginia. *Id.*, Nov. 7, 1885.

1886. Gold Mining in North Carolina. *Bulletin N. C. Dept. of Agriculture*, March, 1886.

1888. The Construction of Topographical Maps by Reconnoissance Methods. *Prac. Ark. Soc. Eng.*, 1888.

1888. Relations of Geology and Engineering Practice. [An address before the students of the Ark. Indus. University, 1888.]

1889. Preliminary Report upon the Coal Regions of Arkansas. *Am. Rept. Geol. Surg. of Ark.*, 1888, iii.

1890. The Coal Beds of Lafayette County. Bull. I, *Geol. Surv. of Mo.*, 1890.

1890. The Geotectanis and Physiographic Geology of West Arkansas. Bull., *Geol. Soc. of Amer.*, ii.

1890. Charles Albert Ashburner. A biographical sketch. *Amer. Geol.*, Aug.

1890. Remarks on the Construction of Topographic Maps for Geologic Purposes. *Proc. A. A. A. S.*, xxxix, 1890.

1891. Biennial Report of the State Geologist of Missouri to the 36th General Assembly. App. to *Home Jour.*, 1891.

1891. The Missouri Coal Measures and the Conditions of their Deposition. *Bull. Geol. Soc. Am.*, v. 3, 1891.

1891. A Preliminary Report of the Coal Deposits of Missouri. *Report of Mo. Geol. Survey.* 1891, i.

1891. Relations of Geological Surveys to Successful Mining. [An address before Institute Mining Convention, Springfield, Mo.] *Science*, Dec. 25, 1891.

1892. Missouri Mineral Products in 1892. *Eng. and Min. Jour.*, Jan. 2, 1892.

1892. An Illustration of the Flexibility of Limestone. *Am. Jour. Sci.*, xliii.

1892. The Higginsville Sheet in Lafayette County. Area Report, No. 1. *Mo. Geol. Sur.*, 1892.

1892. The Mapping of Missouri. *Trans. Acad. Sci. of St. Louis*, vi, No. 3.

1892. Historical and Statistical Sketch of the Iron Industry of Missouri. Appen. B. Vol. ii. *Rept. of Geol. Survey of Mo.*, 1892.

1893. Biennial Report of the State Geologist of Missouri to the 37th General Assembly. Appen. *Senate Jour.*, 1893.

1893. The Size and Scale of Maps. A discussion. *Amer. Geol.* Jan., 1893. Pph., author's edition, 1893.

1893. Notes on the Cambrian in Missouri and the Classification of the Ozark Series. *Amer. Jour. Sci.*, xlv.

**Wood, Louis F.**, S. B., V. (M. I. T.) 1873.

1873. On the Estimation of Arsenic as Pyroarseniate of Magnesia. *Am. Jour. Sci.* [3], vi, 368–371.

**Woodbridge, S. Homer**, A. M. Instr. 1883 —.

1884. The Heating and Ventilation of the New Building of the Mass. Institute of Technology. *Proc. Soc. Arts, M. I. T.*, 1883–84, 119–130.

1885. Some Practical Results in Heating and Ventilation as Observed at the Mass. Institute of Technology. *San. Eng.*, xii, 310–329.

1886. Application of Solar Heat to the Warming of Buildings. *Proc. Soc. Arts, M. I. T.*, 1885–86, 33.

1887. Heating and Ventilation. *Tech. Quar.*, i, 376.

1888. Critical Study of Heating and Ventilation of New Buildings, Mass. Institute of Technology. *Tech. Quar.*, ii, 76, 192. Also reprinted.

1888. Profit and Loss in School House Ventilation. Ventilation of the Machine Rooms of Paper Mills and other notes. *Tech. Quar.*, May, 1888.

1889. A Method of Locating and Ventilating small School Houses. *Proc. of Boston Soc. Civ. Eng.*, Dec. 18, 1889.

1890. Heating and Ventilation of the State House, Augusta, Me. *Sixth An. Rept. of State Brd. of Health, Me.*

1890. (With G. Lanza, G. F. Swan and F. W. Chandler.) The Engineering Building. *Proc. Soc. Arts, M. I. T.*, 1888–89, 129. Also reprinted.

1890. The Timby System of Heating and Ventilation. *Sci.*, xv.

1892. Plans for Ventilating and Heating School Houses. *Seventh An. Report of State Board of Health, Me.*

1893. Warming and Ventilation of the New High School Building, Lynn, Mass. *School Committee's Report*, 1893.

1893. Principles and Practice of Ventilating and Warming Buildings and other Enclosures. Vol. 1, Ventilation; Vol. 2, Warming; Vol. 3, Practice. Lith. pp. 400. Boston.

**Woolworth, James G.**, S. B., V. (M. I. T.) 1878.

1878. (With W. B. Allbright and F. H. Morgan.) Sur l'action du chlorure d'éthyle sur la benzine en présence du chlorure d'aluminium. *Comptes rendus*, lxxxvi, 887.

**Woodbury, C. J. H.** Stud. 1869–73.

1873. On the Relative Efficiency of Kerosene Burners. *Jour. Frank. Inst.*, Aug., 1873.

1874. Description and Duty of the Lynn Pumping Engine. *Id.*, Jan., 1874.

1875 —. Boston Manufacturer's Mutual Fire Insurance Company. Numerous Reports on Hydraulic Experiments and other Tests upon Automatic Sprinklers and other Fire Apparatus, and other Engineering Matters, including: Regulations for Installation of Electric Lighting Apparatus.

Also, various contributions to the *American Machinist*, 1881 to date, *Engineering*, 1884 to date, *Iron Age*, 1882 to date, *Electrician*, 1884 to date, *Electrical Review*, 1884 to date, and editorials in the *Electrician* in 1883.

1879. The Effects of Atmospherical Changes upon Textile Bands. *Id.*, July, 1879.

1879. On Spinning Banding. *Trans. N. E. Cotton Mfrs. Asso.*, 26, 41.

1880. Friction of Lubricants. *Id.*, 28, 58.

1880. Experiments upon Friction. *Proc. Am. Asso.*, 1880, 182.

1880. Measurements of the Friction of Lubricating Oils. I. *Trans. Am. Soc. Mech. Eng.*, 1, 73.

1881. Fire Protection of Mills. *Id.*, 2, 301.

1881. Mill Floors. *Id.*, 2, 468.

1882. Chronograph for Engineering Purposes. *Id.*, 3, 191.

1882. On Roller Thread Guides. *Trans. N. E. Cotton Mfrs. Asso.*, 32, 50.

1882–83. Electric Lighting in Mills. *Id.*, 33, 14 and 34, 63.

1882. Tests of Automatic Sprinklers. *Iron Age*, June, 1882.

1882. Automatic Hatchways for Elevators. *Id.*, Sept., 1882.

1882. Fire Protection of Mills and Construction of Mill Floors. 8vo. New York, 2d edition, 1883.

1883. Electric Lighting in Mills. *Jour. Frank. Inst.*, Jan., 1883.

1883. Portable Electric Testing Apparatus. *Id.*, Jan., 1883.

1883. Comparative Cost of Lubrication by Oils and by Greases. *Trans. Am. Soc. Mech. Eng.*, 4, 318.

1884. Automatic Sprinklers for Fire Extinction. *Proc. British Asso. Adv. Sci.*, 1884, 894.

1884. Measurements of the Friction of Lubricating Oils. II. *Trans. Am. Soc. Mech. Eng.*, 6, 136.

1885. Systems of Cataloguing and Indexing Notes. *Id.*, 6, 365.

1885. The Replicas of the Archaic Coins from the British Museum at the Art Club. *Boston Transcript*, Jan., 1885.

1885. Automatic Sprinklers for Protection against Fire. *Proc. Soc. Arts, M. I. T.*, 1884–85, 149.

1885. Legislation of the States and Territories on Forest Preservation. *Trans. Am. Soc. Civ. Eng.*, xiv, 318.

1885. Coefficient of Efflux of Automatic Sprinklers. *Proc. Am. Asso.*, 1885, 159.

1886. Relation of Electric Lighting to Insurance. *Trans. Nat. Elec. Light Asso.*, 1886, 188.

1886. The Prevention of Fire. *Building*, Nov., 1886.

1887. Uses of Electricity in Mills. *Elec. Eng.*, Nov. and Dec., 1887.

1888. Evolution of the Modern Mill. *Cornell University*, Mar. 2, 1888. *Sci. Am. Supp.*, May 28, June 2.

1888. Protection of Watches against Magnetism. *Proc. Am. Ass.*, xxxvii., 81.

1888. Physics in Public Schools. *Elec. Eng.*, vii, 334.

1889. Electric Welding. *Trans. Am. Soc. Mech. Eng.*, x, 95.

1890. Construction of Central Stations. *Id.*, ix, 98.

1890. Methods of Reducing the Fire Loss. *Trans. Am. Soc. Mech. Eng.*, xi, 27.

1891. Fire Hazards of Electricity. *Cornell University*, Nov. 6, 1891. *Elec. Eng.*, Dec., 1891.

1891. Conflagrations in Cities. *Jour. Frank. Inst.*, cxxxii, 129, 207.

1891. Methods of Reducing the Fire Loss. *Cassier's Mag.*, i, 27, 125.

1892. Electrical Transmission of Power for Cotton Mills. *N. E. Cotton Manuf. Ass. Bull.*, No. 53, Oct. 26, 1891, and *Elec. Eng.* 1892.

1892. History and Development of Automatic Sprinklers. *Cassier's Mag.*, Feb.–March, 1892.

1892. Lynn, Past and Present. Published by Oxford Club, Lynn, 1892.

1892. The Saugus Iron Works at Lynn, Mass. [Address on the First Casting made in America.] Published by City of Lynn, Nov., 1892.

1892. Electric Mill Lighting. [Address before the Thomson Scientific Club.] *Elec.*, May 18, 1892.

1893. Recent Development in Electrical Transmission of Power. April 26, 1893. *Trans. N. E. Cotton Mfrs. Asso.*, No. 54.

1893. Electrical Transmission of Power for Mills. *Trans. N. E. Manf. Asso.*, Oct., 1892. Also *Cassier's Mag.*, iii, 27.

**Woodward, Amos, E.**, S. B., III. (M. I. T.) 1888.

1889. (With R. H. Richards.) The Velocity of Bodies of Different Specific Gravity Falling in Water. *Trans. Am. Inst. Min. Eng.*, xxii, 644. Also *Tech Quar.*, iii, 151.

**Wrinkle, Lawrence F. J.**, S. B., III. (M. I. T.) 1870.

1893. A Method of Carrying a Survey Line Down Shafts. *Eng. Min. Jour.*, Jan. 28, 1893.

**Zalinski, E. L.**, First Lieut. U. S. A. Prof. 1873–76.

1873–76. Reports on Department of Military Instruction. *M. I. T. Prest's Rep.*, 1873, 61–65; 1874, 18–22; 1875, 21–23; 1876, 154.

1874. Letter to Faculty with reference to Military Instruction. In Report of a Committee of the Corporation, June 16, 1874. pp. 11–16. [The Committee's Report is in *M. I. T. Prest's Rep.*, 1874, 22–32.]

1875. Letter to Corporation with reference to the Military Instruction, Oct. 11, 1875. Pph. 8vo, pp. 6.

1876. Regulations and Suggestions for the C. C. M. I. T. Trip to Philadelphia. Pph. 32mo, pp. 20. Boston.

# MASSACHUSETTS

# INSTITUTE OF TECHNOLOGY.

---

OFFICERS.

EXTRACTS FROM ACT OF INCORPORATION.

OBJECTS AND PLAN.

BY-LAWS.

---

BOSTON:
PRINTED BY JOHN WILSON AND SON,
5, WATER STREET.
1862.

# OFFICERS

OF THE

# MASSACHUSETTS INSTITUTE OF TECHNOLOGY,

FOR THE YEAR 1862–63.

---

### President.

WILLIAM B. ROGERS.

### Vice-Presidents.

JOHN A. LOWELL.
JACOB BIGELOW.
MARSHALL P. WILDER.
JOHN CHASE.

### Secretary.

THOMAS H. WEBB.

### Treasurer.

CHARLES H. DALTON.

### Committee on Instruction.

WILLIAM B. ROGERS.
J. D. PHILBRICK.
HENRY B. ROGERS.
G. W. TUXBURY.
JOHN A. LOWELL.
A. A. HAYES.
J. B. FRANCIS.

### Committee on Museum.

ERASTUS B. BIGELOW.
FRED. W. LINCOLN, JR.
JONATHAN PRESTON.
S. P. RUGGLES.
RALPH HUNTINGTON.
ALEXANDER H. RICE.
R. C. GREENLEAF.

### Committee on Publication.

J. D. RUNKLE.
LORENZO SABINE.
C. L. FLINT.
GEORGE B. EMERSON.
J. C. HOADLEY.

### Committee on Finance.

M. D. ROSS.
EDWARD ATKINSON.
JAMES M. BEEBE.
E. S. TOBEY.
E. H. ELDRIDGE.

# EXTRACTS

FROM

# THE ACT OF INCORPORATION.

---

SECTION 1. — William B. Rogers, James M. Beebe, E. S. Tobey, S. H. Gookin, E. B. Bigelow, M. D. Ross, J. D. Philbrick, F. H. Storer, J. D. Runkle, C. H. Dalton, J. B. Francis, J. C. Hoadley, M. P. Wilder, C. L. Flint, Thomas Rice, John Chase, J. P. Robinson, F. W. Lincoln, Jr., Thomas Aspinwall, J. A. Dupee, E. C. Cabot, their associates and successors, are hereby made a body corporate, by the name of the MASSACHUSETTS INSTITUTE OF TECHNOLOGY, for the purpose of instituting and maintaining a society of arts, a museum of arts, and a school of industrial science, and aiding generally, by suitable means, the advancement, development, and practical application, of science in connection with arts, agriculture, manufactures, and commerce; with all the powers and privileges, and subject to all the duties, restrictions, and liabilities, set forth in the sixty-eighth chapter of the General Statutes.

SECT. 2. — Said Corporation, for the purposes aforesaid, shall have authority to hold real and personal estate to an amount not exceeding two hundred thousand dollars.

SECT. 4, *in part.* — Persons from all parts of the Commonwealth shall be alike eligible as members of said Institute, or as pupils for its instruction; and its Museum, or Conservatory of Arts, at all reasonable times and under reasonable regulations, shall be open to the public.

# OBJECTS AND PLAN.

THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY has for its objects the advancement of the Mechanic Arts, Manufactures, Commerce, and Agriculture, and of the Applied Sciences generally, and the promotion of the practical education of the industrial classes.

It proposes to attain these ends by each and all of the following modes of operation: —

*First*, By acting as a Society of Arts, whose discussions, researches, and publications shall be directed to the advancement of the Industrial Arts and Sciences, and the diffusion of useful facts and discoveries relating to them.

*Second*, By organizing a Museum of Technology, or Conservatory of Arts, — embracing the materials, implements, machinery, and products of all the practical Arts and Sciences.

*Third*, By establishing a School of Industrial Science, in which regular courses of instruction shall be given, by lectures and other teachings, in the arts of Drawing and Design, and in the various Applied Sciences.*

* For a full account of the Objects and Plan of the Institute, see the printed Report of the Committee of Associated Institutions of Science and Arts, read at a public meeting held at the rooms of the Board of Trade, Oct. 5, 1860; and approved and adopted at the meeting for preliminary organization, in Mercantile Hall, Jan. 11, 1861.

# BY-LAWS.

## Sect. I. — Officers.

1. The Officers of the Institute shall be a President, four Vice-Presidents, a Secretary, a Treasurer, and such Officers connected with the School of Industrial Science and the Museum of Technology as it may hereafter be found expedient to appoint.

## Sect. II. — Government.

1. The general direction, management, and control of the Institute shall be vested in a body, to be called the "Government of the Institute," to consist of the President, Vice-Presidents, Secretary, and Treasurer, and the Chairmen of the several Committees of Arts hereinafter mentioned, together with the members of the Committees on the Museum, on Instruction, on Publication, and on Finance. The Government shall have power to institute from time to time such standing rules and orders, not inconsistent with the By-laws, for regulating the action of the several Committees, the choice of subjects for investigation and discussion, and reports on the same, as it may deem expedient; and shall have power to fill all vacancies occurring in its own body during the current year, except those of Chairmen of the Committees of Arts.

## Sect. III. — Standing Committees.

1. All the members of the Institute shall be enrolled in divisions, under the following heads, according to the taste or preference of the individual, each division to constitute a Standing Committee upon the subjects to which it appertains: —

(1.) On Mineral Materials, Mining, and the Manufacture of Iron, Copper, &c.
(2.) On Organic Materials; — their Culture and Preparation.
(3.) On Tools and Instruments.
(4.) On Machinery and Motive Powers.
(5.) On Textile Manufactures.
(6.) On Manufactures of Wood, Leather, Paper, India-rubber, Gutta Percha, &c.
(7.) On Pottery, Glass, Jewelry, and works in the Precious Metals.
(8.) On Chemical Products and Processes.
(9.) On Household Economy; including Warming, Illumination, Water-supply, Ventilation, and the Preparation and Preservation of Food.
(10.) On Engineering, Architecture, and Ship-building.
(11.) On Commerce, Marine Navigation, and Inland Transportation.
(12.) On Agriculture and Rural Affairs.
(13.) On the Graphic and Fine Arts.

2. A member may belong to more than one of the above-named Committees of Arts, but shall not at the same time be eligible as Chairman in more than one.

3. It shall be competent for each Committee of Arts, of ten or more members entitled to vote, to organize, and elect a Chairman to represent it in the Government, and to frame its own By-laws, provided the same do not conflict with the regulations of the Institute.

4. The following Standing Committees, each to consist of not less than three members, shall be appointed at the annual meeting: —

The Committee on Instruction.
" " on the Museum.
" " on Publication.
" " on Finance.

5. The Committee on Instruction shall have the supervision of the School of Industrial Science, both as to its organization and its business-affairs; subject to the direction of the Government.

6. The Committee on the Museum shall be charged, under like direction of the Government, with the internal economy, and business-concerns, of the Museum of Technology.

7. The Committee on Publication shall have the general direction of the printing of the proceedings and other publications of the Institute, including the selection of papers and discussions which have been presented at the meetings.

8. The Committee on Finance shall have the general supervision of the financial affairs of the Institute; and all vouchers of expenditure, before payment by the Treasurer, must be approved by the Committee.

9. An Auditing Committee of three associate members shall be chosen annually, whose duty it shall be to examine the accounts and vouchers of the Treasurer for the ensuing year, and report to the next annual meeting.

## Sect. IV. — Members, and their Election.

1. Members of the Institute shall be of three kinds, — Associate, Corresponding, and Honorary Members.

2. All those persons who have already united in the preliminary organization of the Institute, and whose names are affixed to the Preamble adopted Jan. 11, 1861, at a meeting

held in Mercantile Hall, in Boston, together with all others who shall have been enrolled at the time of the adoption of these By-laws, shall be considered Associate Members of the Institute.

3. Candidates for Associate Membership must be citizens of Massachusetts, and must be proposed and recommended by not less than two members, whose signatures shall be affixed to a written form to that effect. The nomination, after being announced by the President, shall be posted, for the inspection of members, until the second regular meeting thereafter, when the election shall be conducted by ballot; three-fourths in the affirmative constituting an election.

4. Corresponding and Honorary Members may be chosen, without respect to citizenship, on nomination by the Government.

5. An Associate Member shall pay an admission-fee of two dollars before being entitled to the privileges of membership, and be subject to an annual assessment not exceeding five dollars; the amount to be determined from time to time by the Government.

6. An Associate Member, by paying the sum of fifty dollars at any one time, may become a member for life, and be thereafter exempted from the annual assessments.

7. A member neglecting to pay his annual assessment, for six months after being notified that the same is due, shall be regarded as having withdrawn his membership, unless otherwise decided by the Government, who shall be authorized, for cause shown, to remit the assessment for any one year.

### Sect. V. — Election of Officers and Committees.

1. At the Ordinary Meeting next but one preceding the Annual Meeting, a Nominating Committee shall be chosen, consisting of seven members, — three by the Government from its own body, and four by the Institute at large, — whose duty it shall be to nominate the President, Vice-Presidents,

Treasurer, and the Committees of Instruction, of the Museum, of Publication, and of Finance, and the Auditing Committee, to serve for the ensuing year. They shall prepare a balloting list of the names selected, which, as early as convenient, shall be posted in a place accessible to the members, and of which printed copies shall be furnished to the members at or before the time of election.

2. Two Tellers, nominated by the President, shall collect the ballots, cast up the votes, and report the names and numbers of the votes to the President, who shall thereupon announce the same to the meeting. A majority of votes shall be necessary to an election.

3. The Secretary shall be elected annually by the Government.

## Sect. VI. — Duties of Officers.

1. The President, and, in his absence, one of the Vice-Presidents, in the order of their numbers, shall preside at the meetings of the Institute and of the Government.

2. It shall be the duty of the Secretary to give notice of, and attend, all meetings of the Institute and of the Government; to keep a record of the business and orders of each meeting, and read the same at the next meeting; to conduct the correspondence of the Institute, when not otherwise ordered; to keep a list of the members of the Institute; to collect the assessments and other dues, and pay them over to the Treasurer; to notify officers and members of their election, and of their appointment on committees; to prepare, under the direction of the Government, an Annual Report of the transactions and condition of the Institute; and generally to devote his best efforts to forwarding the business and advancing the interests of the Institute.

3. The Treasurer shall keep an account of all moneys received and expended for the use of the Institute; and shall make disbursements only upon vouchers, approved by the